VOLUME L NUMBER TWO

THE NATIONAL GEOGRAPHIC MAGAZINE

AUGUST, 1926

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THE Society also had the honor of subscribing a substantial sum to the expedition of Admiral Peary, who discovered the North Pole.

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THE Society is conducting extensive explorations and excavations in northwestern New Mexico, which was one of the most densely populated areas in North America before Columbus came, a region where prehistoric peoples lived in vast communal dwellings and whose customs, ceremonies, and name have been engulfed in an oblivion.

THE Society also is maintaining expeditions in the unknown area adjacent to the San Juan River in southeastern Utah, and in Yunnan, Kweichow, and Kansu, China—all regions virgin to scientific study.

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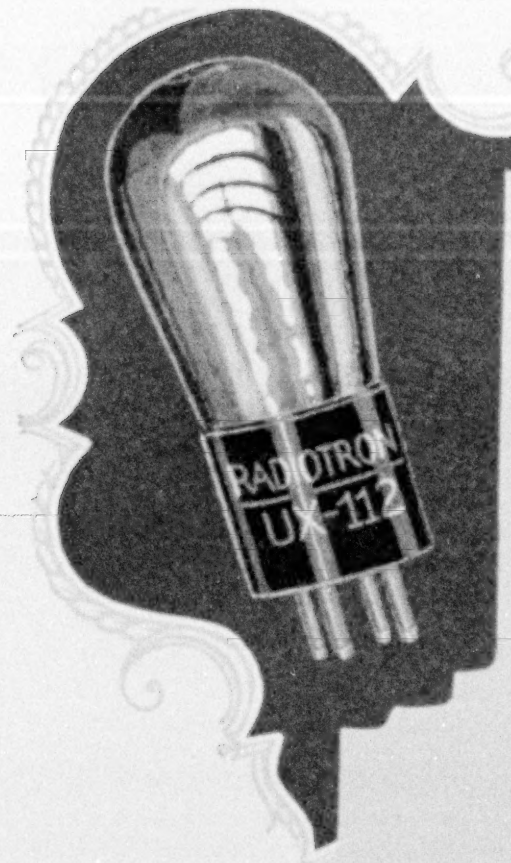

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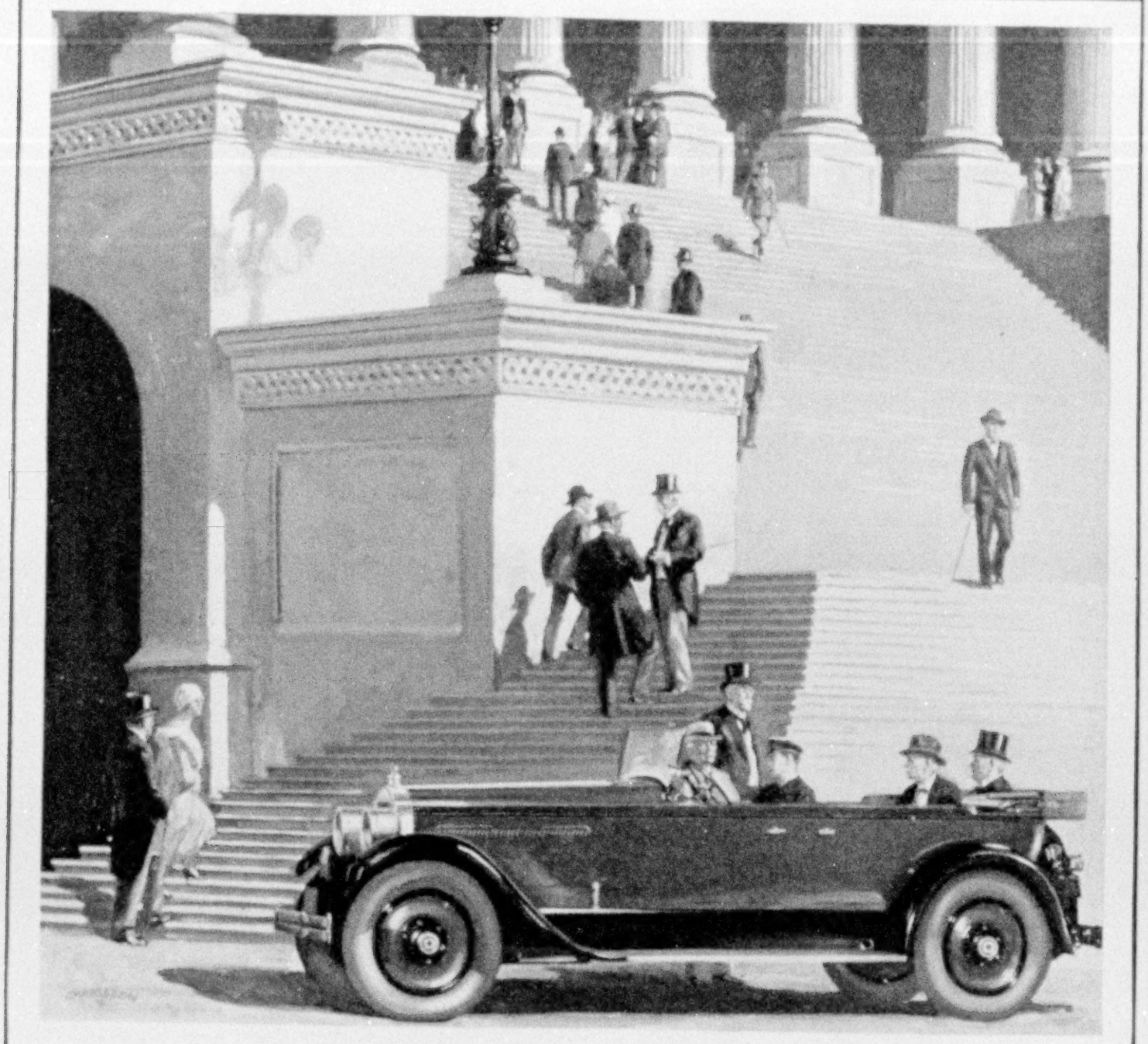

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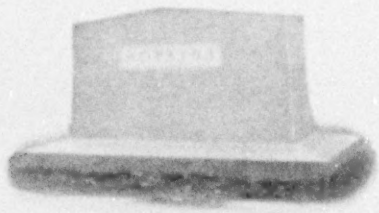

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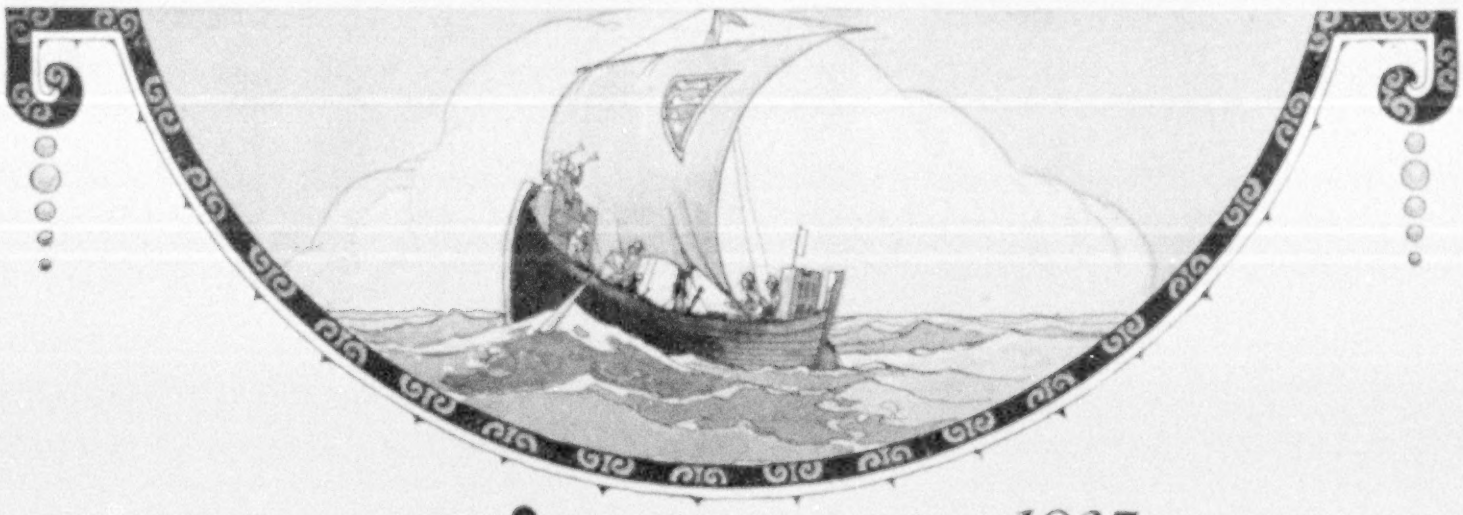

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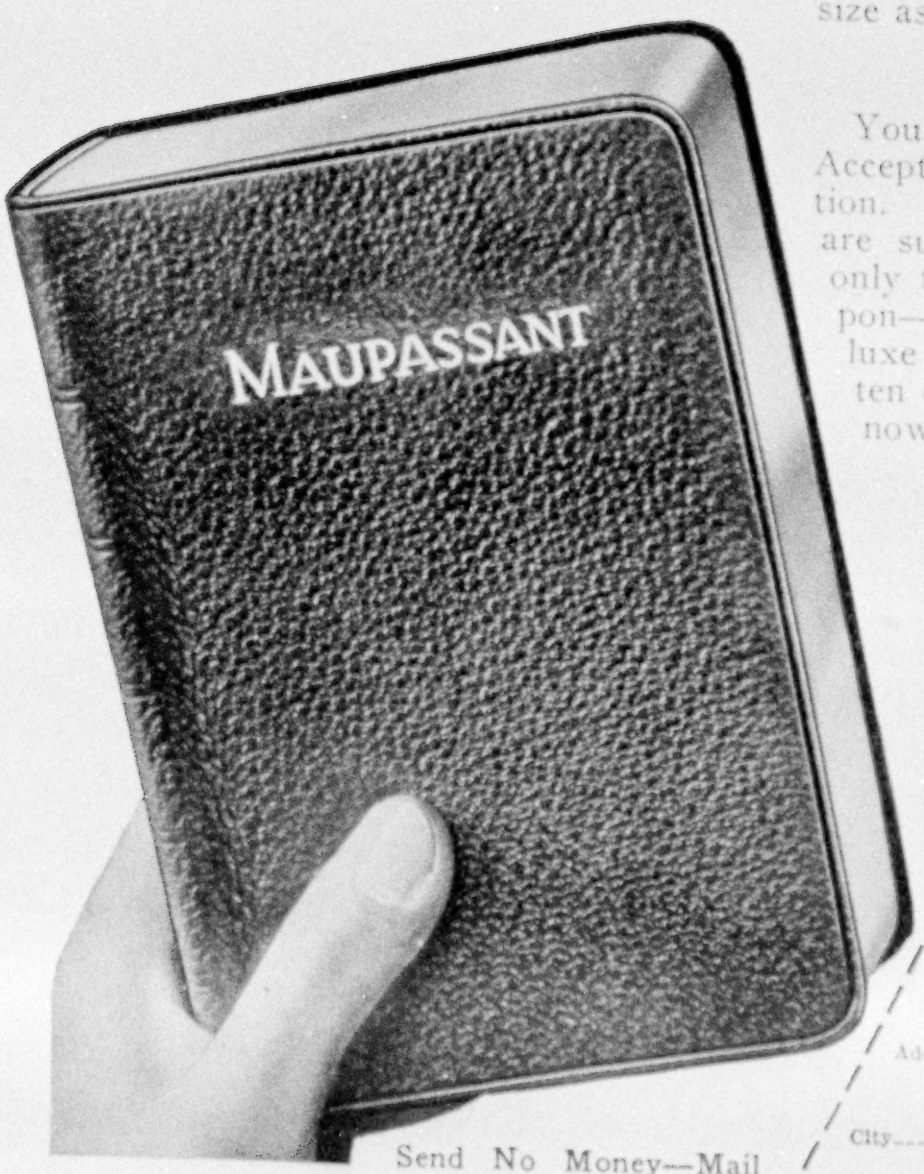

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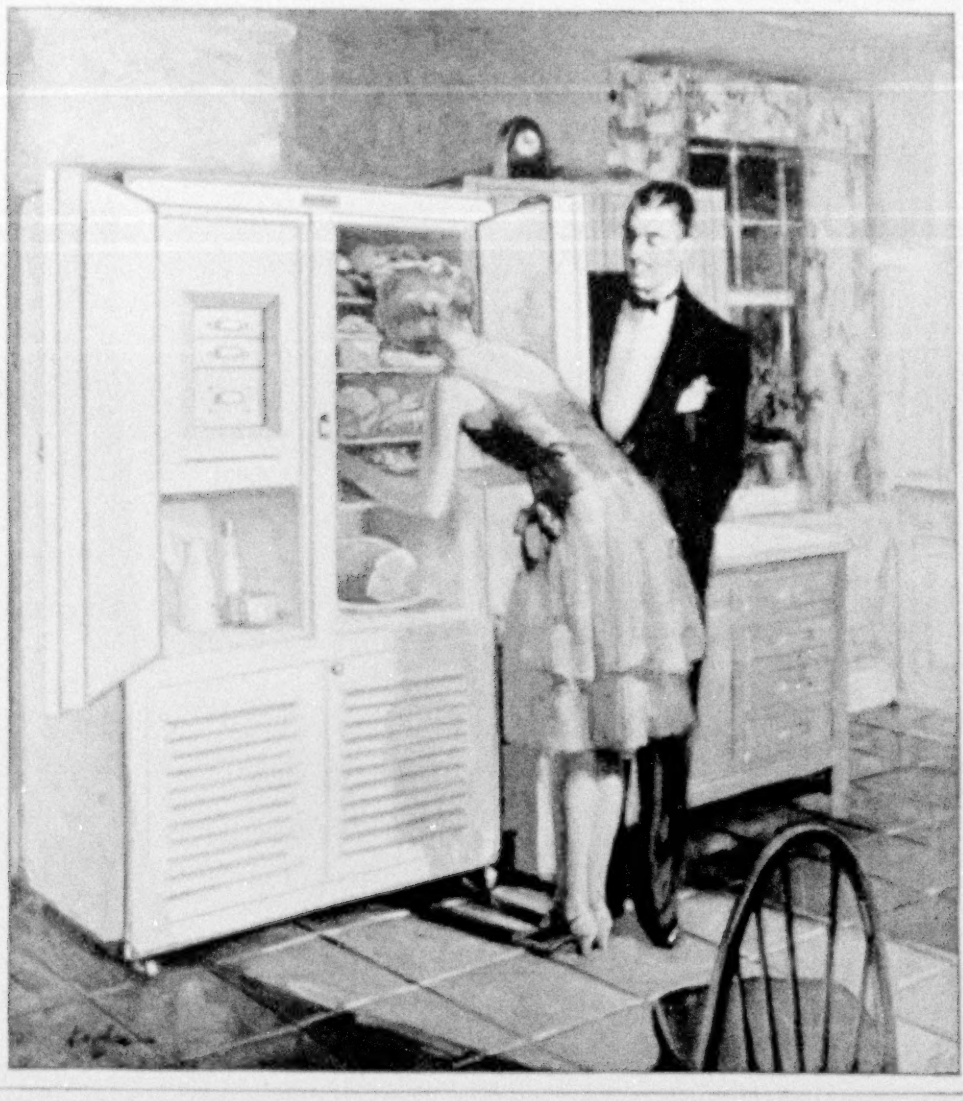

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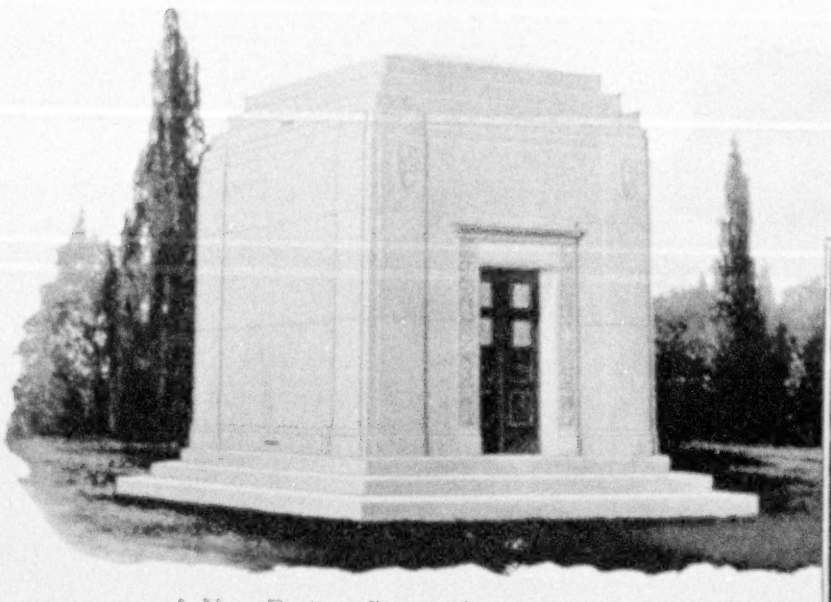

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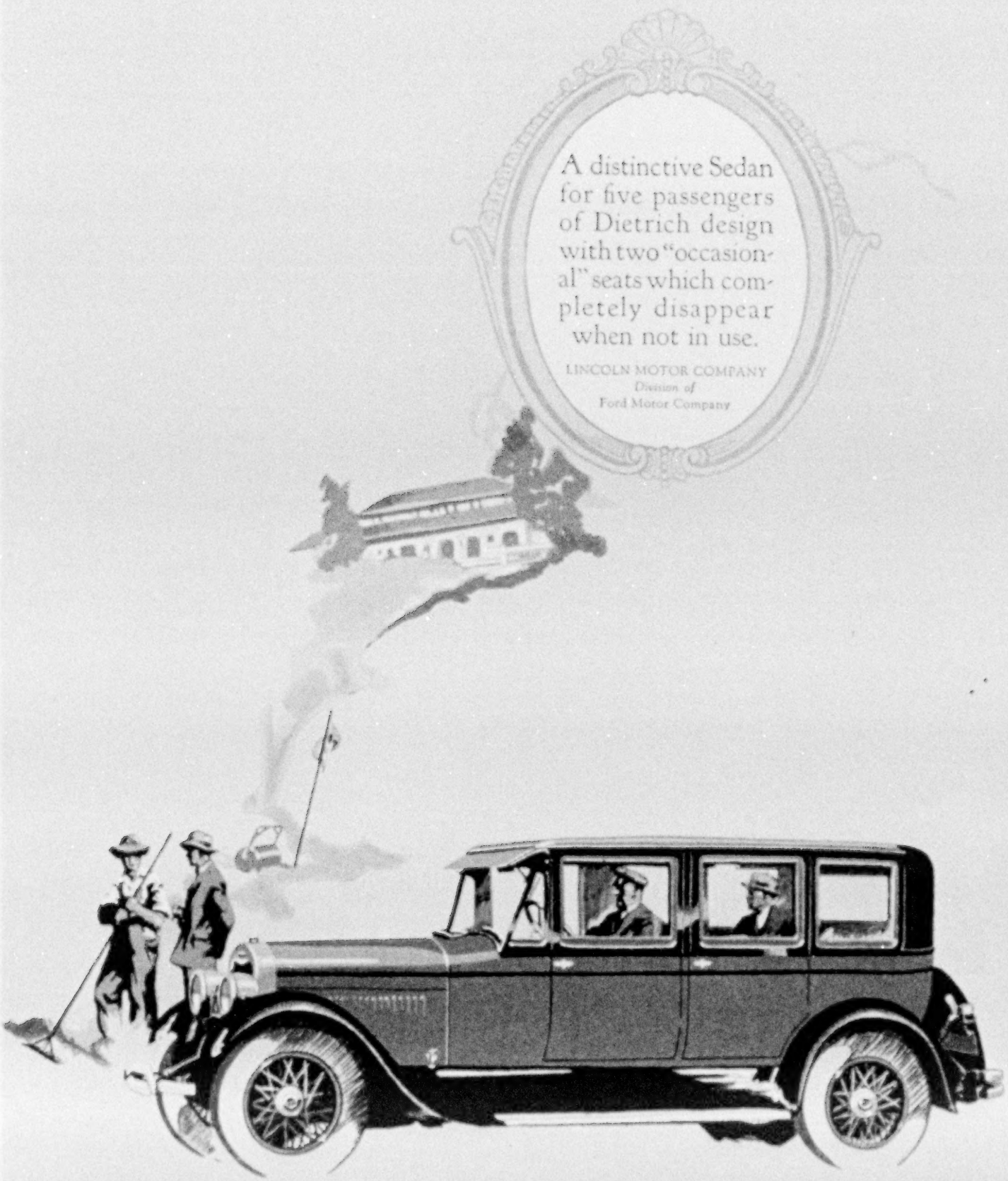

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If your feet are normal, congratulate yourself. But if you are having difficulty do not delay in getting medical advice. You may need a different type of shoe, or special foot exercises, or some particular kind of arch support.

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EXCRUCIATING pain is only part of the misery that follows abuse of the feet. Stubborn cases of headache, backache, continued fatigue, poor circulation, indigestion, unruly nerves, spinal disorders, pain often mistaken for kidney trouble, neuritis or rheumatism—each may have its origin in the feet.

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The Metropolitan Life Insurance Company recognizes the importance of protecting the feet as a means of safeguarding health. It has just published a booklet, "Foot Health" which contains a great deal of valuable information.

This booklet tells about the various kinds of foot troubles—and what causes them. It explains how to avoid the suffering and dangers attendant upon foot ailments. It shows how incorrect shoes and wrong methods of walking and standing cause foot distress and often contribute to bodily ills and mental depressions.

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The Sampler satisfies at all seasons. Gives every one in a group of travelers a candy to his taste.

VOL. L, No. 2 WASHINGTON AUGUST, 1926

THE NATIONAL GEOGRAPHIC MAGAZINE

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THROUGH THE GREAT RIVER TRENCHES OF ASIA

National Geographic Society Explorer Follows the Yangtze, Mekong, and Salwin Through Mighty Gorges, Some of Whose Canyon Walls Tower to a Height of More Than Two Miles

BY JOSEPH F. ROCK

LEADER OF THE NATIONAL GEOGRAPHIC SOCIETY'S YÜNNAN PROVINCE EXPEDITION, AUTHOR OF "THE LAND OF THE YELLOW LAMA," "BANISHING THE DEVIL OF DISEASE AMONG THE NASHI," "EXPERIENCES OF A LONE GEOGRAPHER," "HUNTING THE CHAULMOOGRA TREE," ETC., IN THE NATIONAL GEOGRAPHIC MAGAZINE

With Illustrations from Photographs by the Author

WHERE in all the world is to be found scenery comparable to that which awaits the explorer and photographer in northwestern Yünnan Province, China, and in the mountain fastnesses of Tsarüng, in southeastern Tibet?

Few have been privileged to climb the towering ranges separating the mightiest streams of China, if not of Asia. The whole region, so geologists tell us, was once one vast, high plateau, now intersected and eroded by some of the longest rivers in the world.

These rivers changed this high plateau not merely into a land of lofty mountains, but of deep valleys with gloomy shadows and forbidding gorges never trodden by human foot.

In these trenches the Salwin, Mekong, and Yangtze, cutting through mountain ranges 20,000 feet in height, make their way to the oceans. These three rivers, flowing parallel, north to south, for some distance in western China and southeastern Tibet, at one place come within 48 miles of each other, as the crow flies, and yet their mouths are separated by thousands of miles (see map, page 134).

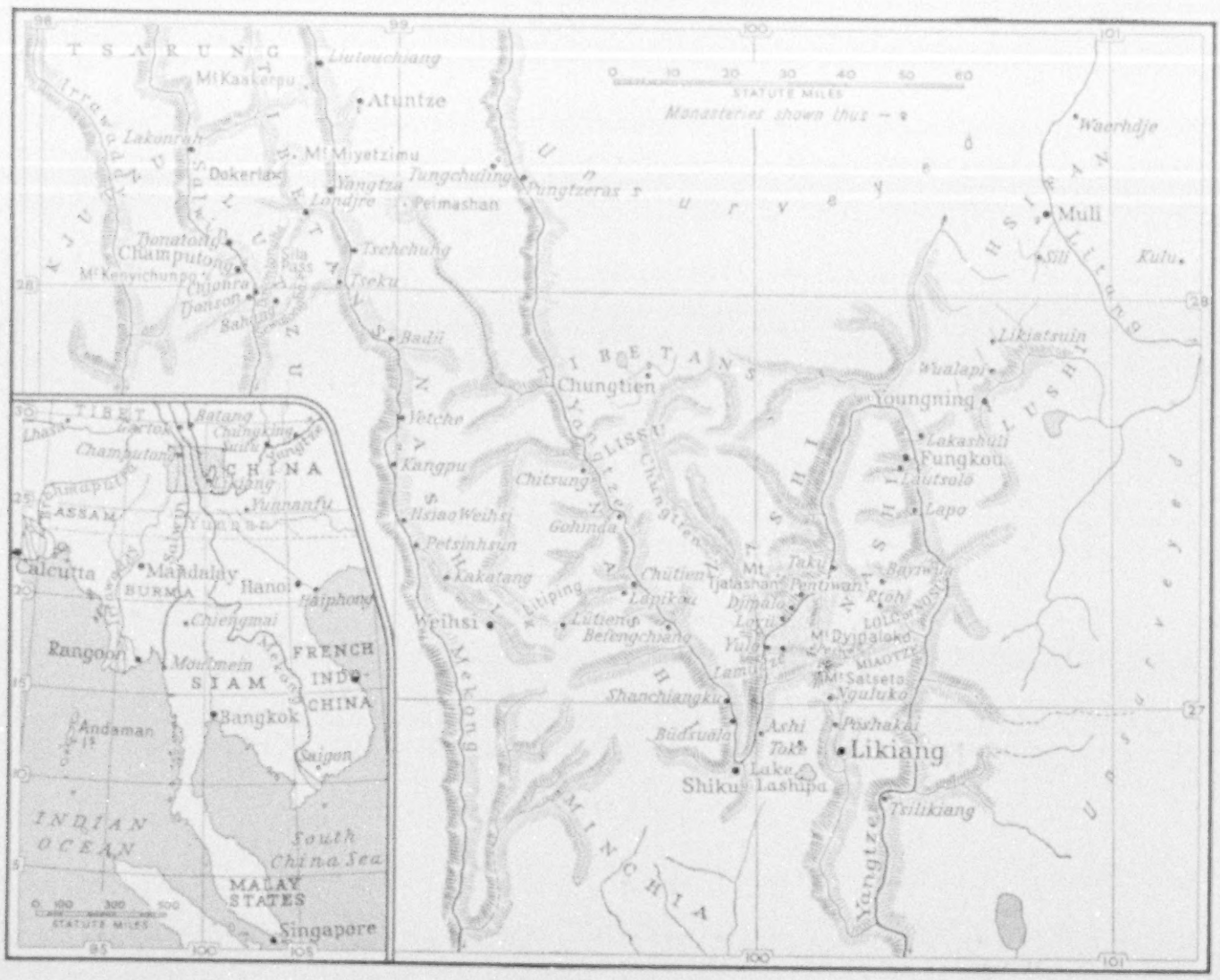
It was this region which I wanted to bring home to America in pictures when I led the National Geographic Society's Yünnan Province Expedition.*

THE FIRST PHOTOGRAPHS EVER MADE OF MANY SCENES

No white man had previously had a glimpse of many of the scenes here photographed, for the few explorers who have penetrated these terrifying fastnesses have done so when the snow-crowned peaks were hidden from view by the enveloping monsoon clouds of summer.

All three of these rivers have their

* See "The National Geographic Society's Yünnan Province Expedition," by Gilbert Grosvenor, LL. D., in the NATIONAL GEOGRAPHIC MAGAZINE for April, 1925.



Drawn by C. E. Riddiford

WHERE THE GREAT RIVER TRENCHES OF ASIA RUN PARALLEL

In Yünnan Province, China, the Yangtze, the Mekong, the Salwin, and the eastern branch of the Irrawaddy flow south for a considerable distance; then each takes its separate way, the Yangtze to enter the Pacific near Shanghai; the Mekong to enter the South China Sea, and the Salwin and Irrawaddy the Indian Ocean (see pages 133-136).

origin in the high plateau land of Tibet, but their ultimate sources are still unknown.

The Salwin, which flows for a long distance through Tibet proper, enters Yünnan south of Tibet. In its southward course it becomes part of the Burmo-Siamese border and finally enters the Indian Ocean at Moulmein, made famous by one of Kipling's poems.

The Mekong parallels the Salwin to about the 20th degree of latitude; then turns westward, forming the border of three countries—Burma, Siam, and Indo-China—and finally enters the tropical South China Sea near Saigon.

The Yangtze, the mightiest and longest of them all, is also the least consistent. It flows parallel to the Mekong to a point near Shiku, and thence makes a sharp curve, turning directly north; describes a huge loop which adds hundreds of miles to the length of the river; returns to the south, then turns to the east, becoming in part a boundary for the provinces of Yünnan and Szechwan, and at length bends to the northeast and enters the Pacific Ocean near Shanghai.

Of these rivers, the Salwin is the least known; it is navigable for only a short distance above its mouth. The Yangtze, on the other hand, is navigable for a distance of some 1,500 miles, to Chungking, and thence by small boats as far as Suifu. Beyond that rowboats ply as far as Machang, in eastern Yünnan. In the north, near Batang, it is navigable by skin boats or coracles, but only for short distances.

Extensive stretches of this river, which is more than 3,000 miles long, are unknown and parts of its course appear on accurate maps as dotted lines.

Much has been written about the Yangtze gorges in the vicinity of Ichang, so

DEATH HAS PASSED THIS WAY

The large paper pagoda hanging from the willow tree signifies that a death has occurred in this house near Shiku. The pagoda is burnt at the place of burial, and the soul of the departed is believed to rise with the smoke into heaven (see text, page 144).

well known to tourists, but very little has been said about the much grander gorges north of Likiang. Few have penetrated even part way into this most terrific of all canyons, among the first being J. Bacot and Dr. Handel-Mazetti, who ventured as far as the hamlet of Djipalo, while I continued my journey to near Taku.

That long stretch of the easternmost arm of the great loop, from Fungkou to Tsilikiang, has also been unexplored, especially south of Lapo. This I followed nearly all the way, bringing back the first photographs of that part of the Yangtze which flows through arid gorges, the walls of which are partly covered with a cactus, a species of opuntia native to America, but now widely distributed in Yünnan by birds, which feed on the succulent fruits, disseminating the unharmed, undigested seeds.

The grandeur of the deeply entrenched rivers is enhanced by the mighty ranges with snowclad peaks which separate them. One of the finest is undoubtedly the Kaakerpu range, separating the Salwin from

RELICS OF TRIBAL WARFARE IN YETCHE VILLAGE

These mud watchtowers were erected about 500 years ago by the Moso kings, who tried to subdue the Mantzu. Similar remains are found all through the arid region of the Mekong Valley. As it seldom rains here, some towers are still in good condition. In Yetche reigns the last surviving king of the Nashi, whose territory extends as far west as the Irrawaddy (see text, page 167).

the Mekong, and which must reach an elevation of 24,000 feet, the highest peak of that range being Mount Miyetzimu (see page 177).

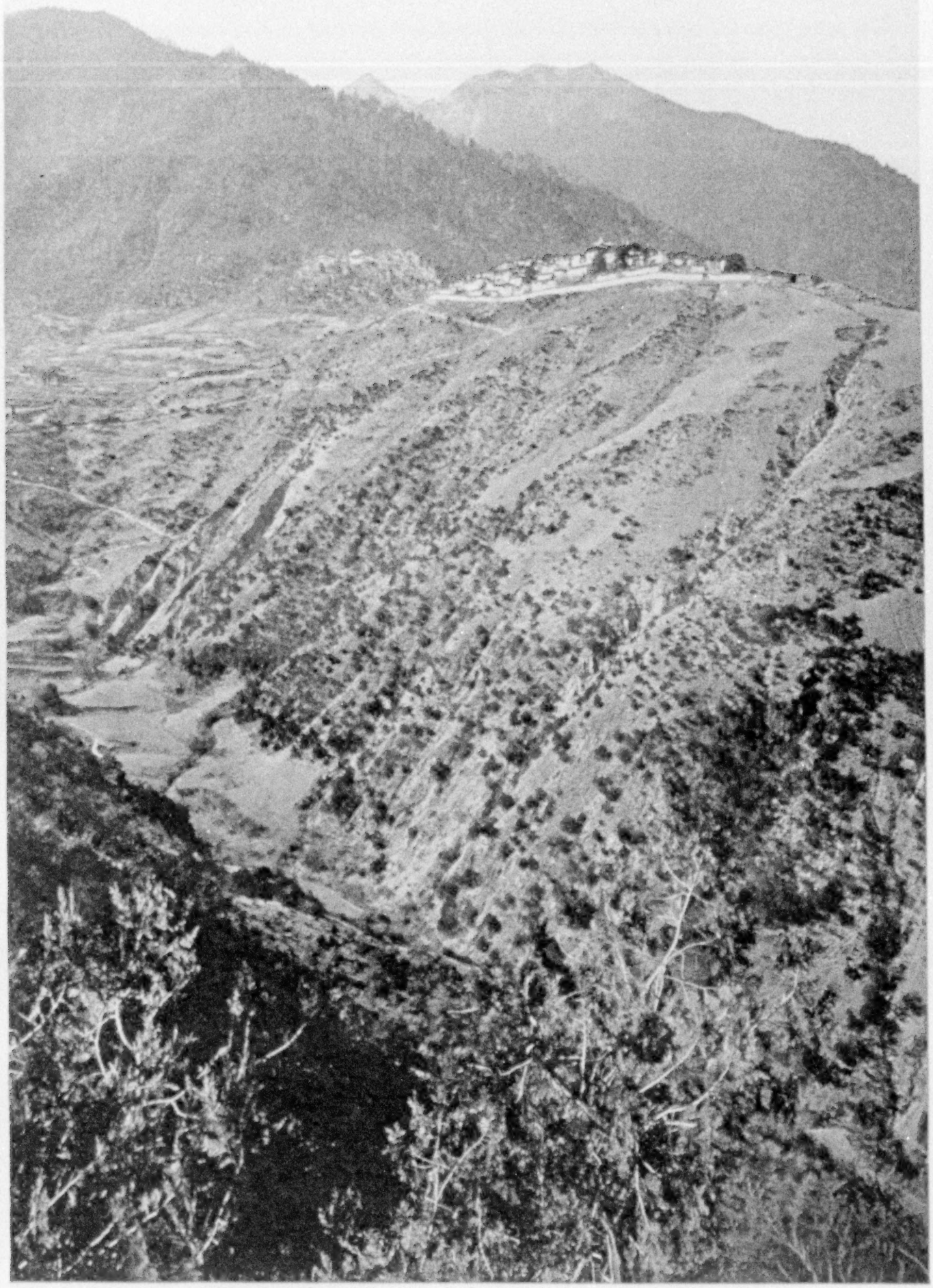
The Mekong-Yangtze divide reaches its highest points, some 20,000 feet, in Mount Peimashan, while the Salwin-Irrawaddy divide culminates in Mount Kenyichunpo, nearly 20,000 feet in height, the eastern branch of the Irrawaddy flowing parallel to the three greater streams for some distance, especially in the Chinese part of its course.

Lured by the magnificence of the mountain ranges and the weird and little-known chasms in which these mighty rivers flow, as well as by the strange tribes living on the slopes of their gorges and in their valleys, early one October I left my headquarters in the little Nashi hamlet of Ngulukö,* on the Likiang snow range, to explore and to photograph.

LARGE CARAVAN SETS OUT FOR THREE MONTHS' TRIP

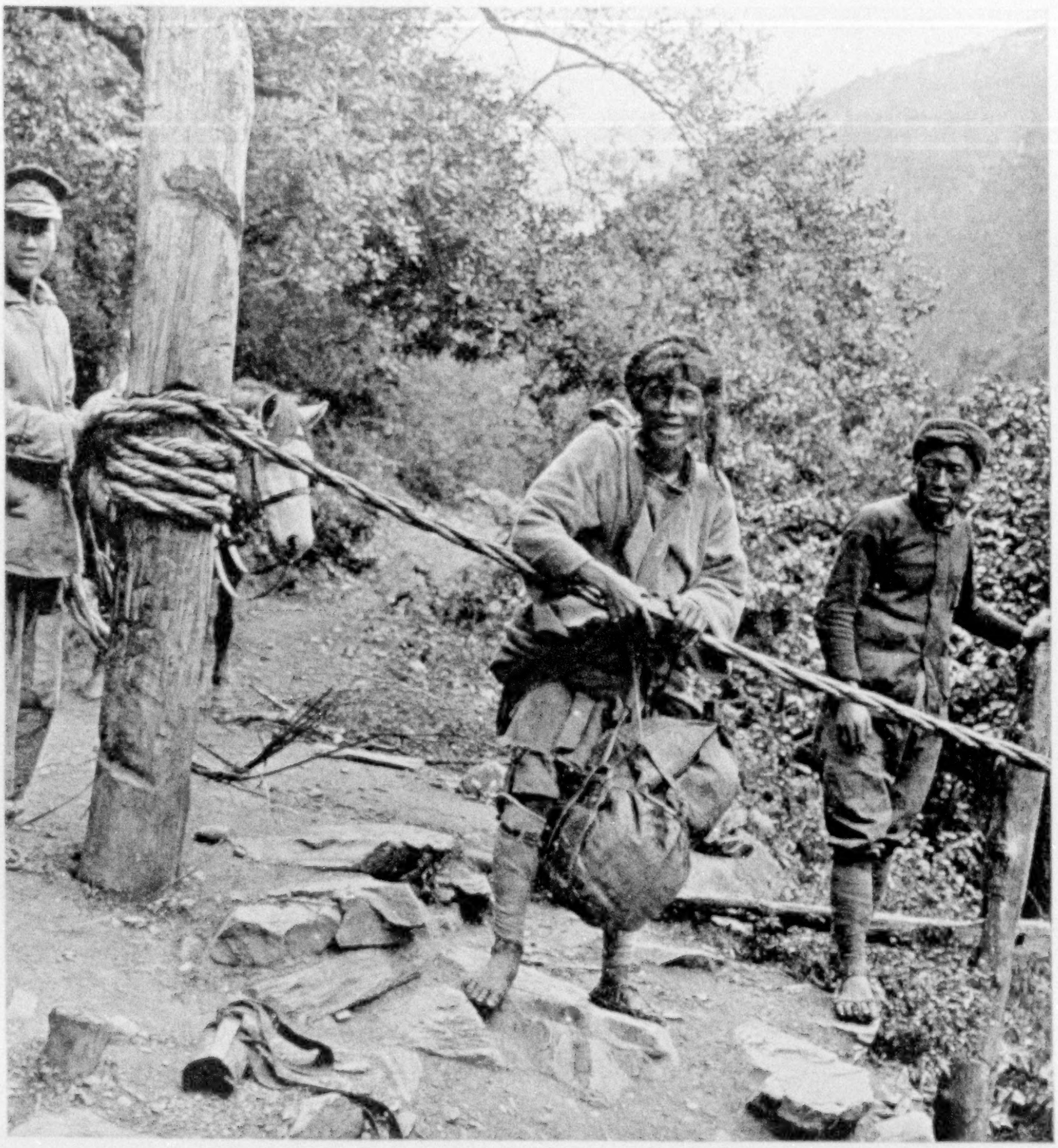
During the whole summer botanical explorations had been carried on in these regions; but, as photography during the rainy months is out of the question, I undertook this special fall and winter

* See, also, "Banishing the Devil of Disease Among the Nashi," by Joseph F. Rock, in the NATIONAL GEOGRAPHIC MAGAZINE for November, 1924.



TUNGCHULING'S GILDED TEMPLE ROOF IS VISIBLE FROM AFAR

The lamasery crowns a sugarloaf hill above this village on the Yangtze, and in the valley back of it is a lama nunnery. The nuns, however, are few and are considered inferior, except when the abbess is a reincarnation of an Indian goddess. At Tungchuling lived the first Christian missionary pioneer along the Tibetan border, a Frenchman who disguised himself as a Chinese trader and compiled a Tibetan vocabulary.



THE ROPE TOBOGGAN HAS NO TERRORS FOR THIS TIBETAN

In crossing, the traveler sits in a sling, with his hands placed over the wooden slider, or grasping the leather thongs to which it is attached. If his hands touched the rope, the friction would burn and lacerate them. Both slider and rope are greased with yak butter to facilitate the crossing.

journey for the purpose of bringing back photographic records.

The monsoon rains were not yet over when I set out with my retinue of 15 men and a large caravan, which carried supplies for more than three months. Our trail took us down the Likiang plain to the hamlet of Pöshakai; thence over a small spur, on the top of which we partook of our noonday meal at a Nashi wayside kitchen.

Men were playing a sort of domino game on the floor, while the women were cooking in shallow iron caldrons, dishing out vegetable soup to a few dirty children who were running about.

As the first day of a journey is always a short one, the caravan never getting started before 10.00 or 11.00 a. m., we decided to stop at the Nashi hamlet of Toke, on the slopes of a spur which we were to cross the next day.

The paved road was execrable and the rain made the much-worn rocks so slip-

THE ROPE BRIDGE OVER THE MEKONG AT LOTA IS WELL ANCHORED

If the ropes are crossed, or if a braided bamboo ring is tied to the rope in the center, above the river, the bridge is unsafe. The Chinese soldier and the two Nashi men, who formed part of the Expedition's escort, were never anxious to make these perilous rope journeys.

pery that whenever possible we used a narrow track beside the pavement. Thus, roads in this part of the world are often entirely abandoned and new ones made by the constant trot of passing caravans.

The night spent in the little temple at Toke was far from restful; fleas innumerable made sleep next to impossible. My men who slept on the ground suffered most, although their Nashi hides must have been inured to such little annoyances.

The following day we climbed a high spur, reaching an elevation of 10,000 feet, and passed through country where enormous sinkholes filled with shrubbery afforded excellent hiding places for roving brigands.

YANGTZE FLOWS PARALLEL TO ITSELF AT DISTANCE OF 15 MILES

A well-graded rock trail brought us down into the Yangtze Valley, and following along the left bank upstream, we reached the hamlet of Shiku, or Rock Drum (see map, page 134).

The Yangtze, coming directly from the north, makes a very sharp curve at this village and returns north again, flowing parallel to itself, not more than 15 miles separating opposite channels. The river is here very wide and in the winter the course is full of islets and sand bars, the breeding ground of ducks, cranes, and other waterfowl.

It was market day in Shiku and its single street was crowded with men, women, mules, pigs, dogs, children, and what not. The crowd was composed mainly of Nashi, Lissu, and Lolo tribespeople, who brought vegetables, pigs, etc., to the market (see page 147).

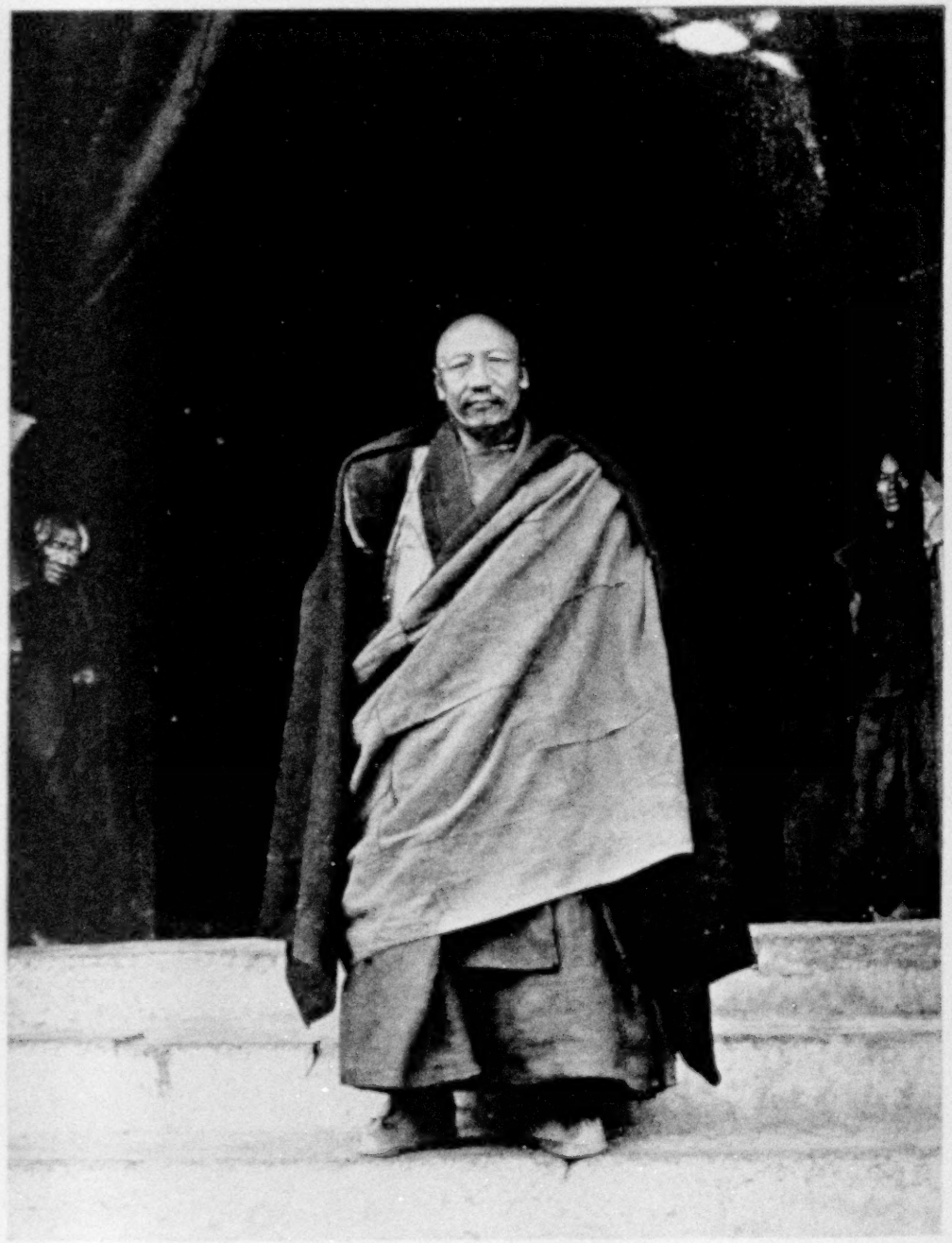
In the central part of the town, built out into the main street, is an open-air theater. Since there are no steps to the stage, I climbed over a memorial stone giving the names of the donors and the amount of money donated toward the building of the theater, and took pictures to my heart's content, while the crowd at the foot of the stage looked on.

THE YÜNNAN GORGES OF THE YANGTZE RIVAL IN GRANDEUR THOSE OF THE BRAHMAPUTRA

Though the Yangtze's gorges in the vicinity of Ichang are well known, little has been written about those which pierce the mighty Likiang snow range. After leaving Yulo the hitherto-placid river turns into a mad torrent which rushes in cascades and rapids through a terrifying canyon 13,000 feet deep, flanked by the Dyinaloko snow-capped mountain mass, more than 19,000 feet high (see text, page 186).

THE NATIONAL GEOGRAPHIC SOCIETY EXPEDITION CROSSES THE SALWIN IN THE DUGOUT CANOES OF THE LUTZU

Only two canoes were serviceable, but even these, rowed by drunken Lutzu, were preferable to a much-used rope bridge for crossing this broad, swift-flowing stream (see text, page 179).



THE RELIGIOUS AND SECULAR HEAD OF TUNGCHULING

The Grand Lama and Living Buddha has just finished a long religious service and stands on the steps of the main shrine. The lamas of this region are not hospitable to strangers.

A TUNGCHULING LAMA IN CEREMONIAL ROBES

He belongs to the yellow sect of the reformed Tibetan Church, the distinguishing mark of which is the yellow ceremonial hat. The cloak is red.

THE LAST OUTPOST OF A CHRISTIAN MISSION: BAHANG

This Lutzu village (the Pehanlo of the Chinese) has been twice burned by the Tibetan lamas of Champutong (see page 179), who forced its intrepid missionary to flee. From November to May, when the passes are filled with snow, the occupant of the mission station and those of the 18 huts are isolated from the rest of the world. Above Bahang rises the Alolaka Range, with the Salwin-Irrawaddy divide in the distance.

The most disagreeable part of traveling in Yünnan is the necessity for spending an occasional night in a town. This usually means dirt, flies, opium smoke, noise, and general discomfort, as there are no chimneys to the houses, and the smoke must find its own way out, which is usually through the badly joined floor of the loft, where I always took refuge to avoid a curious mob.

THE "COMFORTS" OF TRAVEL IN YÜNNAN

In Shiku I occupied a large, barnlike house containing huge stables and granaries, belonging to a rich Likiang Buddhist priest addicted to opium smoking. The only decent place, if that word can be employed—but everything is relative—was the chapel of our lama host, and there, in front of a gilded Buddha, I made myself comfortable—another relative term.

I quote from my diary:

"I am sitting on a balcony while the rain descends heavily. Before me there stretches a long stable full of mules and horses; a noisy little parrot, which I bought for three cents, sits on his stick, while cats and dogs and dirty children create pandemonium and add to the confusion caused by my belated caravan.

"The lead-mule, with his large bell, steps into the muddy courtyard, followed by his hungry cosufferers. Without waiting to have their loads removed, they fight their way to the troughs and try to eat through the baskets tied over their mouths.

"Dogs are stepped upon, pigs squeal, the mules bray, while long-dead ancestors are conjured in unprintable language by the exasperated muleteers. Everywhere mud, dung, cornstalks, and odors which it would be difficult to analyze! Poor cook! In such surroundings he has to produce a palatable meal."

The next morning we started with as much noise as when we arrived. How glorious to get out of such a foul place into the pure, fresh air!

Our trail led us up the Yangtze for several days. The country was quiet and peaceful; clouds hung heavily about the mountains inclosing the river—the last of a monsoon summer.

To the left, on a high, conical hill, was a temple. Of all the places in the world! One pities the caretaker, for his shopping must take some effort, as the sides of the hill are as steep as the walls of a house.

PAPER EFFIGIES BURNED AT A NASHI FUNERAL

At Büdsuölo, a Nashi village, someone had given up his mortal toil; mourners were parading around in grayish-white garments and headdresses, while leaning against the wall of the deceased's house was a long row of almost life-size human effigies made of bamboo framework covered with paper. There were also huge paper horses, sedan chairs, castles, and towers of paper, all to be burned at the grave. These imaginary servants, horses, etc., were to minister unto and comfort the departed in the shadow world (p. 135).

Many lateral ravines open out into the main Yangtze Valley, while the trail passes through dense growths of spiræa, bauhinia, and rhamnus. These bushes and shrubs line the narrow trail, at times almost closing over it. Myriads of spider webs were interlaced and entwined among these shrubs, forming globose masses in which thousands of large yellow spiders with outstretched legs watched for their prey. Unless one held up a stick to separate the yellow threads and make a passageway through this labyrinth, one's head would soon have resembled a yellow ball of twine or fuzzy silk.

"A ROAD IS GOOD FOR TEN YEARS; BAD FOR TEN THOUSAND"

The trail skirts a sandstone wall, built up artificially from the river bed, which showed signs of having been submerged by the last high water. The rocks were loose and near the edge the path had sagged considerably and in many places was washed out.

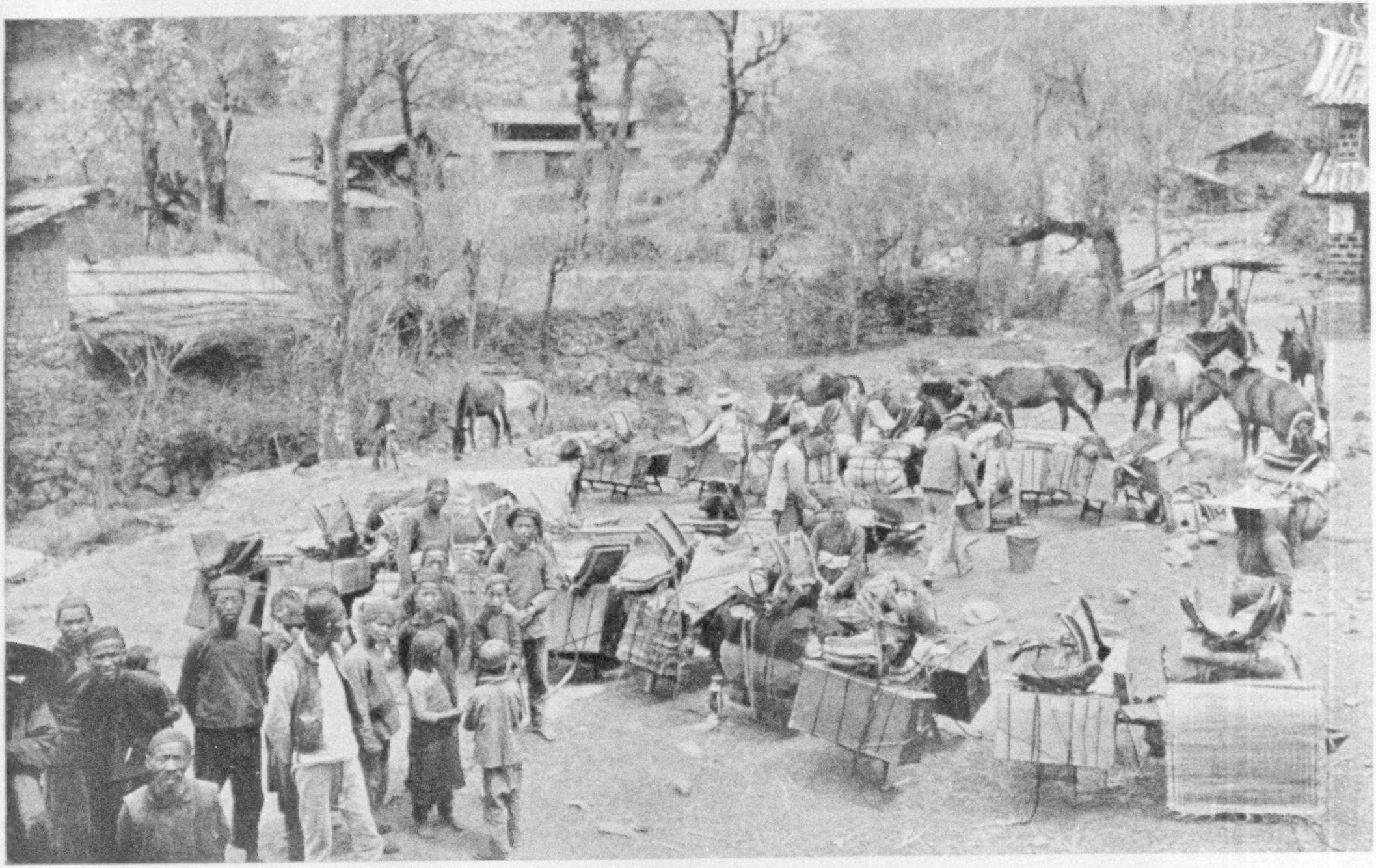
But roads in this part of the world are rarely, if ever, repaired. A Chinese proverb says, "A road is good for ten years and bad for ten thousand."

The mountains are here bleak and dreary, only grass covering the slopes.

Immediately under the sandstone wall I found a newly erected temple. It was open, but the only attendant was a child, who had lighted incense sticks before the gods—three boyish figures about two and a half feet high, leaning against the wall of the altar as if inebriated. My soldiers

A LUTZU WITH HIS CROSSBOW

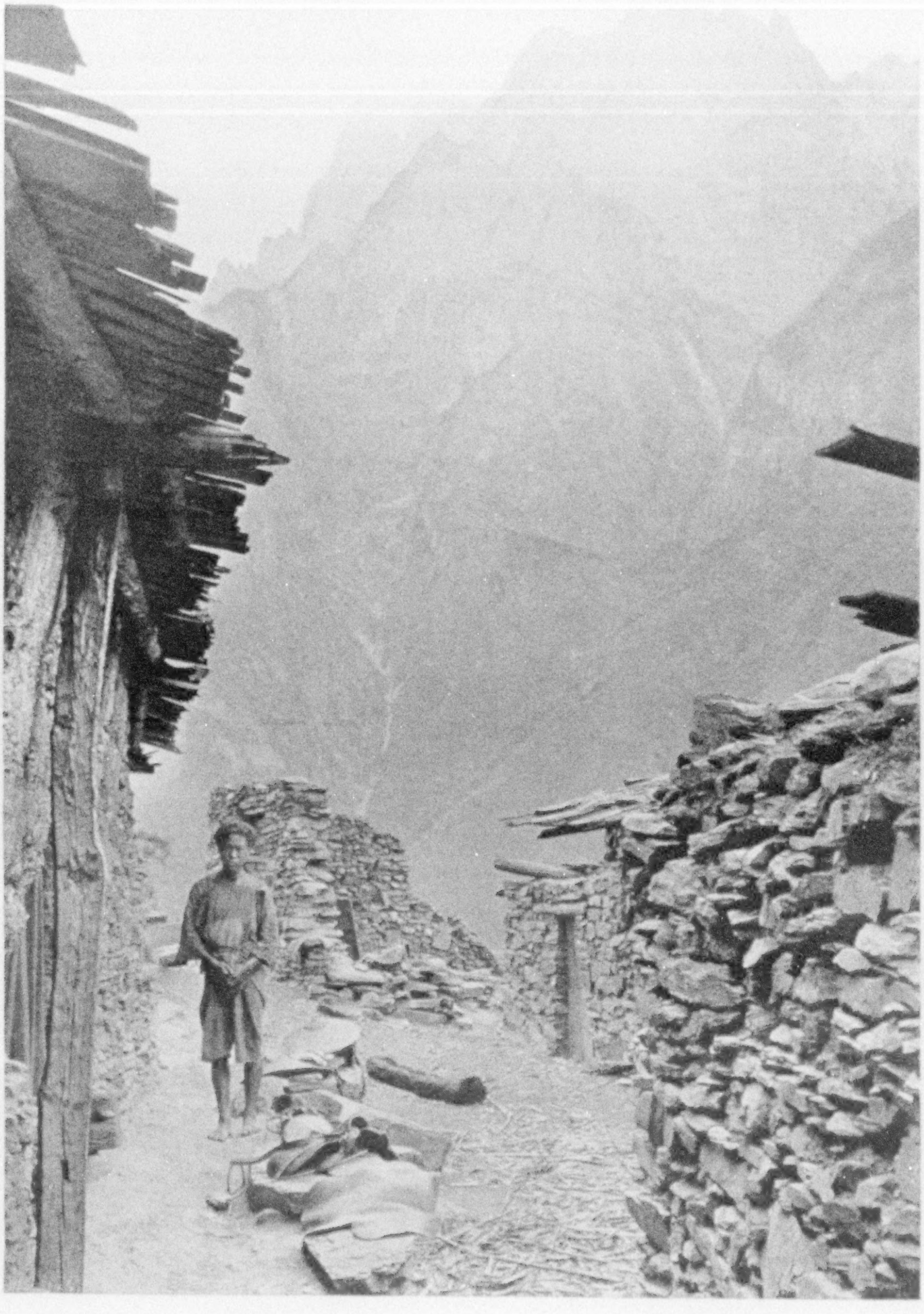
He belongs to a small tribe inhabiting a section of the Salwin Valley just south of Tibet proper. The Lutzu are a peaceful people, small of stature. Even the children of the tribe are expert marksmen with this primitive weapon (see text, page 181).



THE CARAVAN OF THE NATIONAL GEOGRAPHIC EXPEDITION STOPS AT A YÜNNAN VILLAGE FOR LUNCH

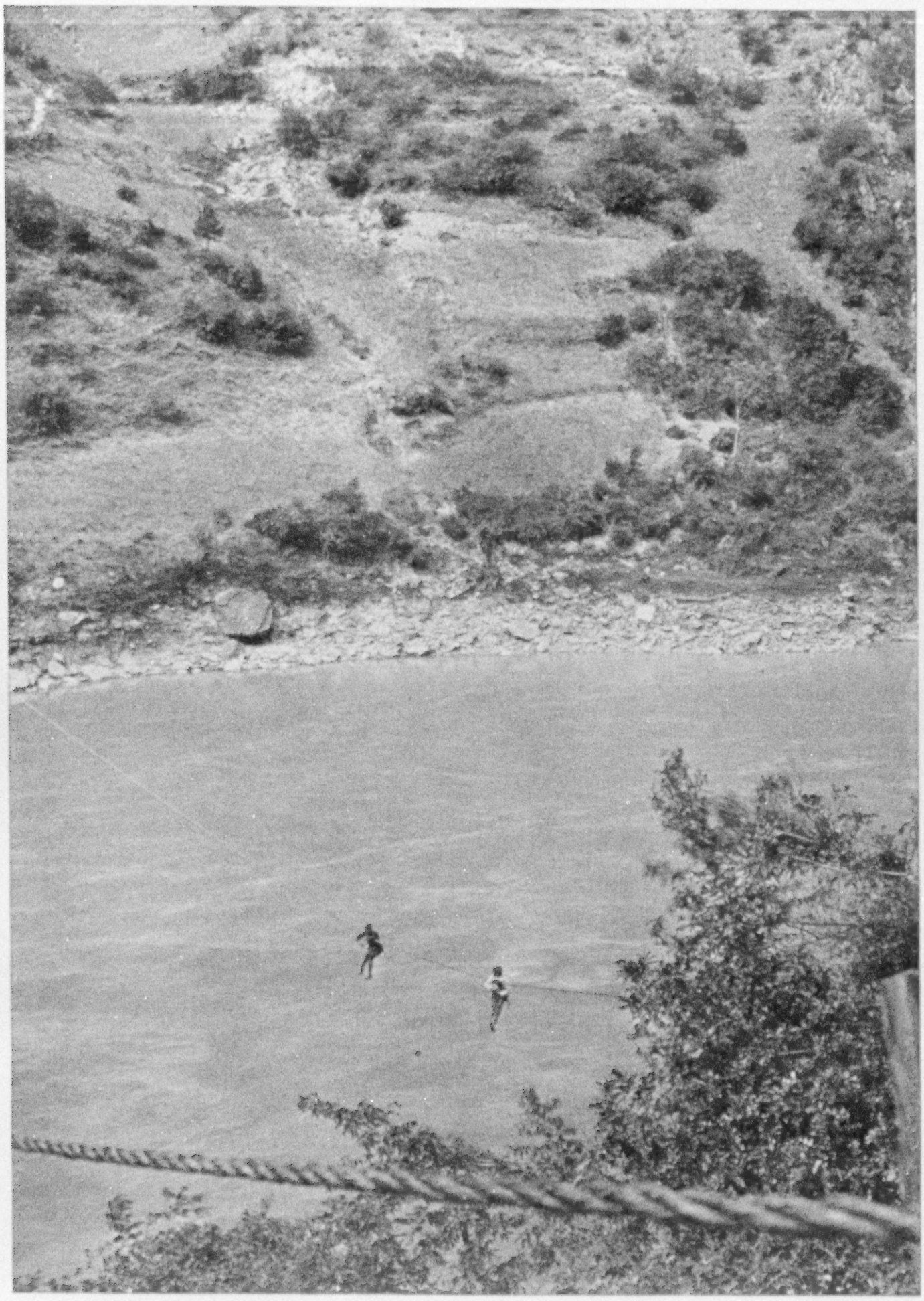
THE MARKET OF SHIKU

The single street of the village is crowded with men, women, mules, pigs, dogs, and children (see text, page 139).



HUTS COMPRISING THE VILLAGE OF DJIPALO, IN THE YANGTZE GORGE

The inhabitants, seven families in all, are natives of Szechwan, who settled in this canyon about 60 years ago.



THE ROPE BRIDGE AT TSEKU

Two of the author's Nashi men are seen crossing the Mekong (see text, page 171). The rope used for crossing the other way is seen at the bottom of the picture.

ONE OF THE HORSES OF THE EXPEDITION BEING SENT ACROSS THE ROPE BRIDGE AT TSEKU

The rope consists of twisted strands of canebrake. Two ropes are necessary to cross in both directions, as the passenger must slide from a higher to a lower level. The second rope (to the right) is used in crossing to the side of the river from which this photograph was made (see text, page 167).

THE HAMLET OF LONDU ON THE MEKONG

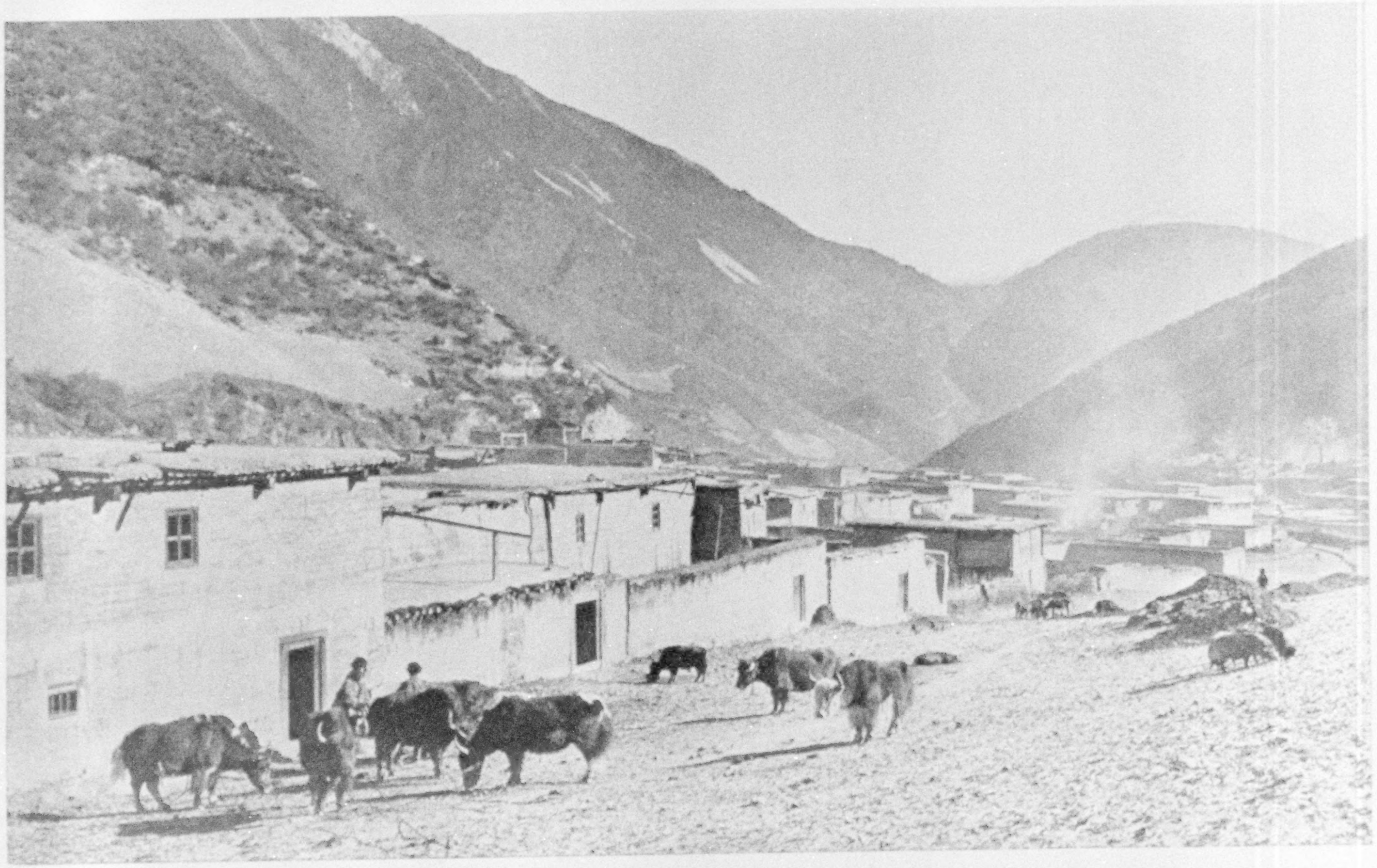
This village, which is shown as Nantao on some detailed maps, is picturesquely situated on a small alluvial fan between Weihsi and Atuntze. Beyond this point to the northward the scenery increases in grandeur.

MOUNT KAAKERPU, WITH A HUGE GLACIER DESCENDING TO THE MEKONG

The river flows deep down in its rocky trench at the foot of the mountain. The photograph was made from an elevation of 13,500 feet above sea level.

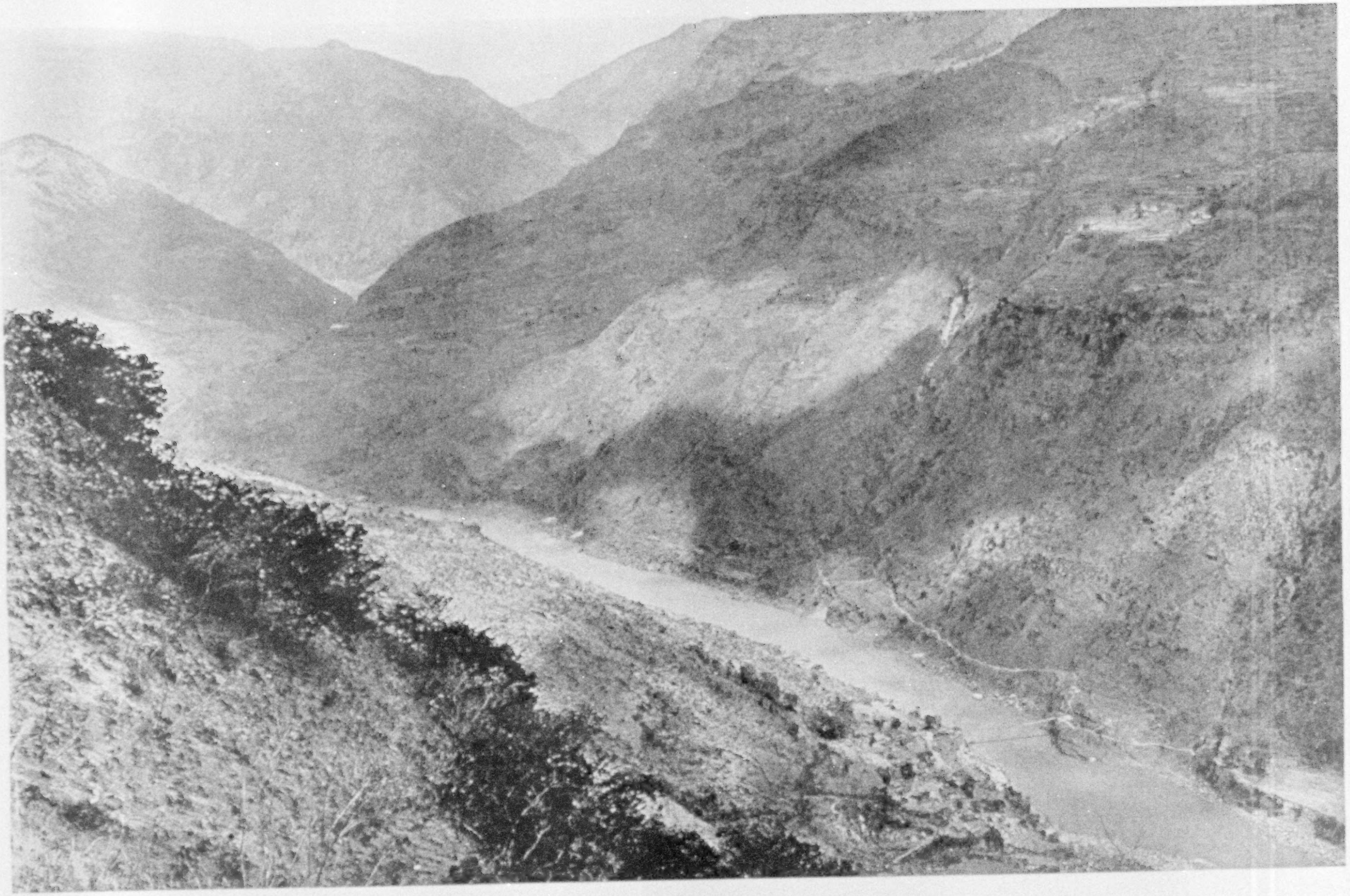
THE EXPEDITION CLIMBING THE DOKERLA ON THE TIBETAN SIDE

The photograph was taken on the return journey from Tjonatong, halfway up the Dokerla-Tsarung side (see text, page 186).



YAKS IN THE TIBETAN VILLAGE OF ATUNTZE; ELEVATION, 11,500 FEET

In 1905 Tibetan lamas killed all of the French missionaries in the Mekong Valley, and the head of Father Dubernard was exposed to view on the gate of the lamasery of this village (see text, page 167).

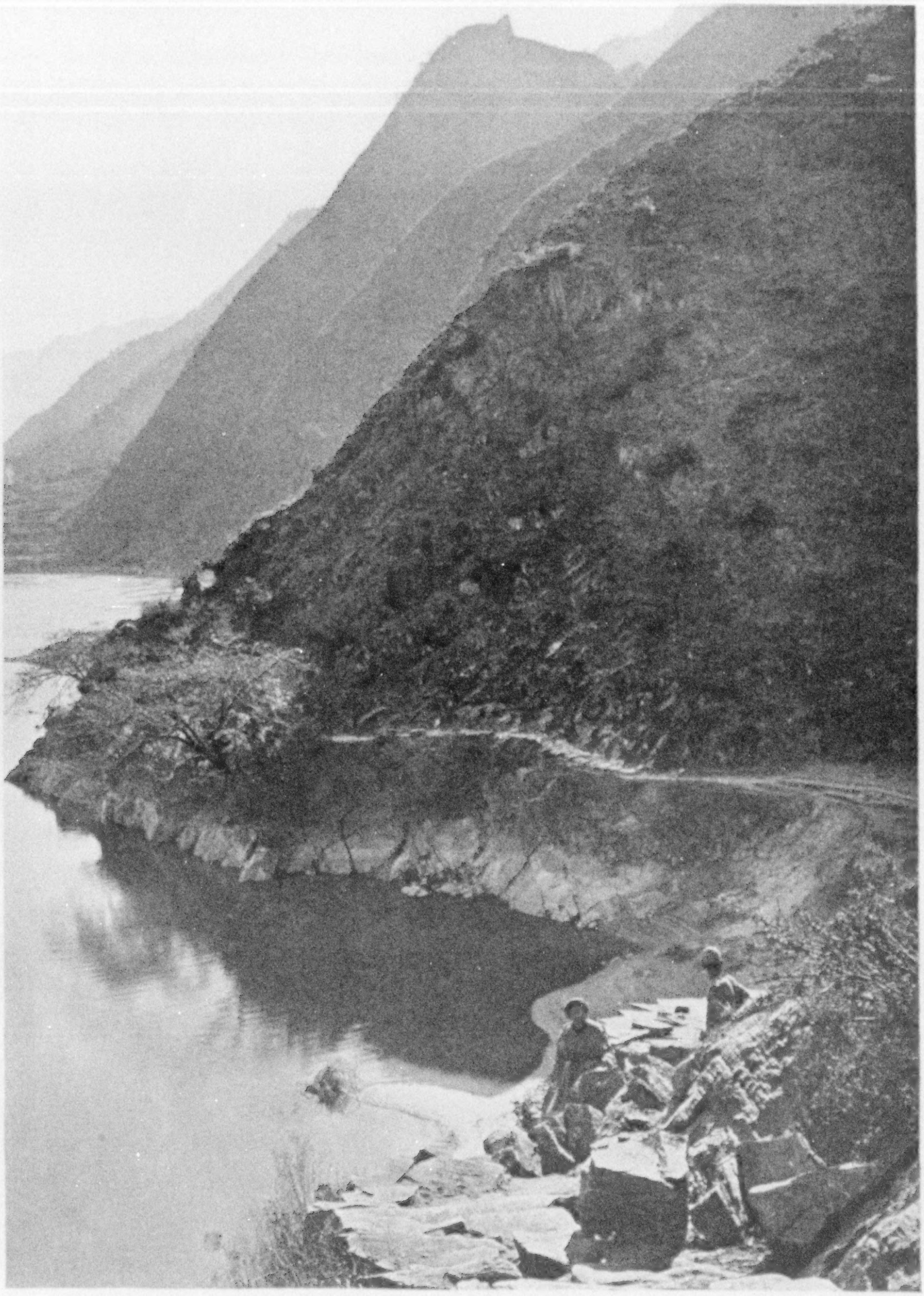


LOOKING UP THE YANGTZE GORGE AT TSILIKIANG

The bridge (see text, page 186) and village can be seen at the bottom of the valley. The actual village of Tsilikiang is not at the bridge, but a short distance on the other side, on the canyon slopes.

A SMILE FROM A CITIZEN OF THE FORBIDDEN LAND

This bright Tibetan boy, who uses his hair as a quiver for his arrows, was photographed on the bank of the Mekong, on the author's trip to the Dokerla.

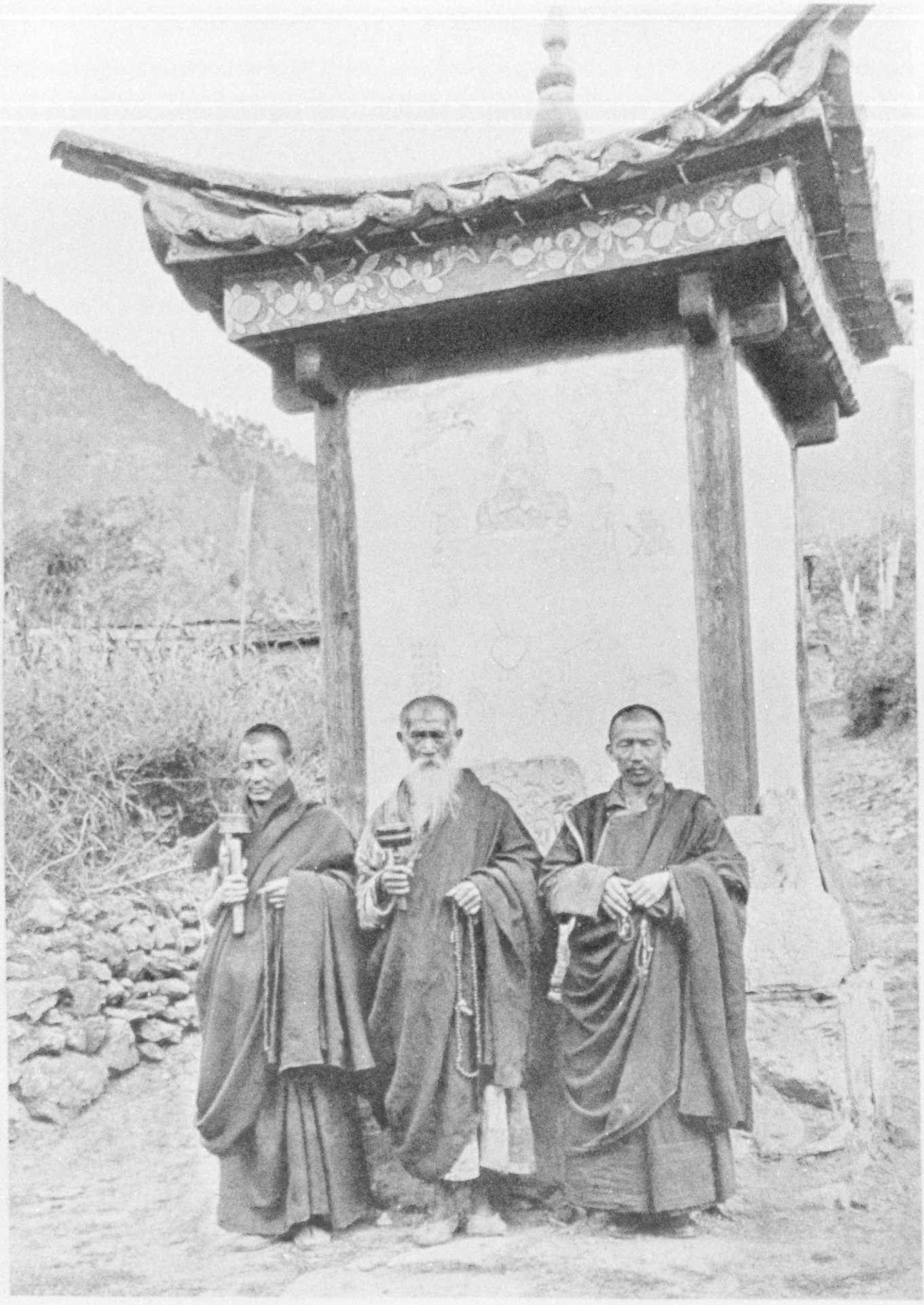


A ROCKY ROAD ALONG THE BANKS OF THE YANGTZE ABOVE SHIKU

This trail hanging above the river was almost impassable. Note the temple crowning the conical height at the top of the picture (see text, page 144).

TIBETAN PORTERS IN A SNOW-COVERED STREAM BED AT THE FOOT OF THE DOKERLA

THE MEKONG ENTERING A NARROW GORGE NEAR YANGTZÀ



THREE NASHI LAMAS OF THE KANGPU LAMASERY IN FRONT OF A SHRINE

"At Kangpu there was a square lama shrine with Buddhas painted on the whitewashed walls, while next to it stood a small incense stove of brick, wherein prayers and cedar or pine branch offerings were burnt" (see text, page 164).

and horse-boy bowed and folded their hands in prayer before them.

Along a weary trail, over mighty passes and through deep and gloomy canyons and glorious forests, we proceeded to Befengchiang, where we stopped for the night in an old farmhouse. I slept upstairs in a black hole of an attic festooned with corncobs. An old table and a barrel and the ever-present family shrine comprised the sole furniture. But, after a long day's march or ride, one cares little about surroundings as long as one has his own bed, table, chairs, and other necessary adjuncts brought with him from the civilized world beyond the ranges, valleys, and plains.

ONE PUPIL OCCUPIES LÜTIEN'S SCHOOL

The fifth day from Likiang we reached Chütien, on the banks of a tributary of the Yangtze, along which our trail now followed a mountain range, up and down through valleys and villages, till we came upon the plain of Lütien and a much-scattered village of the same name, nestling on the slopes of the Mekong-Yangtze divide.

Below us lay a beautiful amphitheater; to the right an imposing building on the hillside, a lamasery, the first outpost of the Tibetan Church. It was difficult to find a place of rest.

On account of the rain, I decided not to pitch our tents, but entered the first building near the bank of a stream. This proved to be the dilapidated schoolhouse of Lütien. A lonely Nashi boy sat at a desk copying Chinese characters. The ceiling had once been papered; sheets of it hung down and supported spider webs which almost touched the boy's head.

We went on in search of better quarters, which we found in the best house of the place. Opium smokers were evicted from the loft, and after I had had the place cleaned I took stock of my surroundings.

Air was plentiful. From my bed I could see the stars, not through the window, but through the ceiling, from which hung bunches of beans as they had been pulled up from the fields to dry. A third of the room was occupied by white circular cakes, a sort of yeast used in the making of wine. A pile of straw, huge baskets, and the ever-present altar of red perforated paper with Chinese characters cut out of gilded paper completed the furniture.

The evening air was wonderful at this elevation (9,000 feet); the rain had ceased and a cloudless, starry sky made us forget the hardships of the road.

A verbal fight between the two families who occupied the house ensued the next morning over the division of the money I was to give them, for one supplied water, the other firewood. Giving each what was deserved, I left them quarreling to their heart's content.

We now ascended through pine and spruce forests to the summit of the Yangtze-Mekong watershed. Litiping, as the divide is known, is one broad, undulating range of alpine meadows, some 11,000 feet in elevation, bordered by a dense forest of the loveliest hemlocks.

The undergrowth consists mainly of a canebrake (*Arundinaria*), while a thick carpet of moss covers the ground. The meadows were one sea of blue and white, for the gentians as well as the edelweiss were all in bloom. Rhododendron bushes, tall anemones, and irises formed a border on the outskirts of the hemlock forests.

The air was bracing, the sunshine glorious; birds were singing and all seemed glad for life.

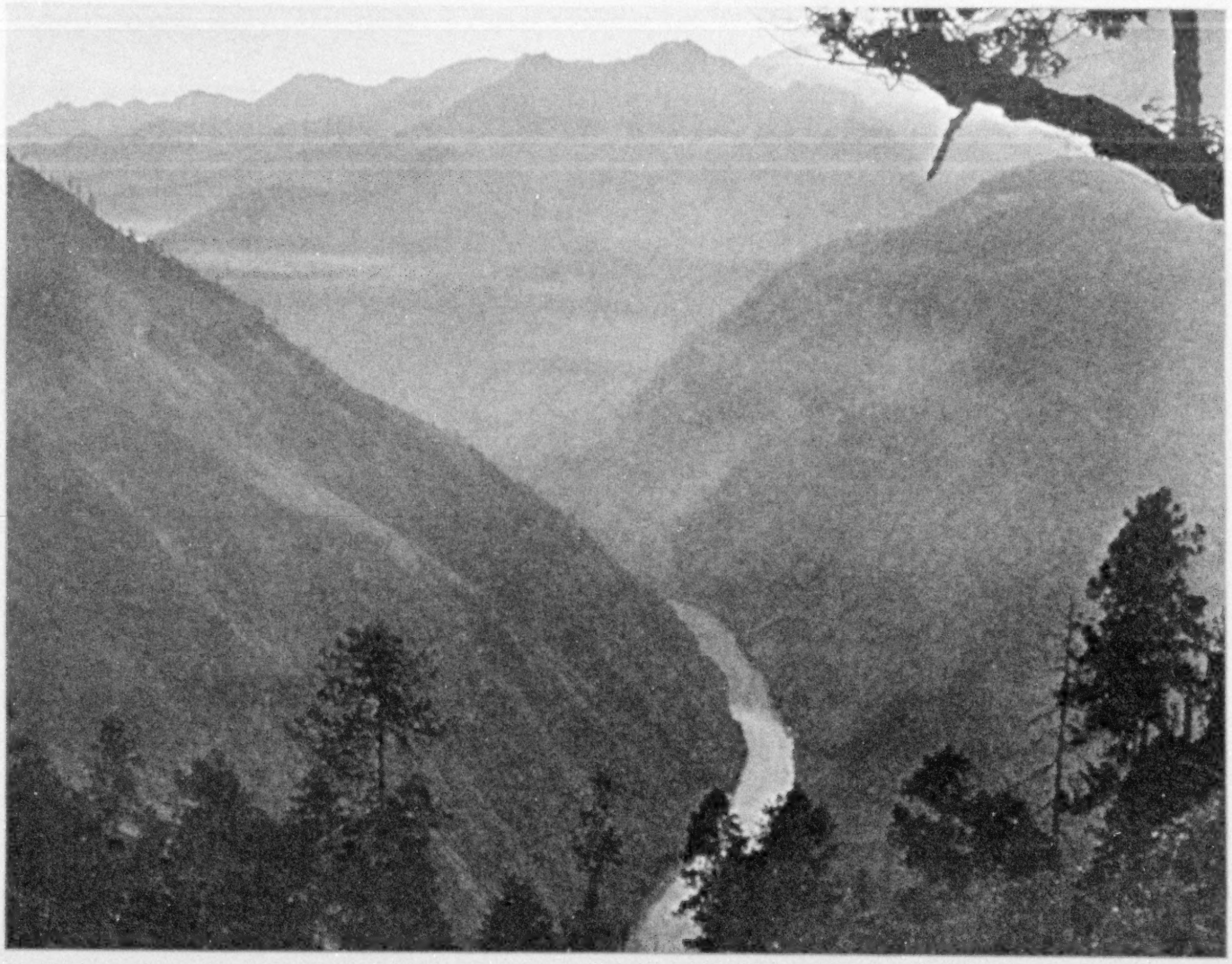
The view toward the Yangtze in the east was wonderful, the long ranges stretching from north to south as far as the eye could see, while at our very feet lay the scattered hamlet of Lütien, still enshrouded in morning mist.

AUTHOR'S MAIL EXHAUSTS WEIHSI'S STAMP SUPPLY

Late that afternoon we arrived at the prefectural town of Weihsi, a forlorn place of about 400 houses situated on a small tributary of the Mekong River.

The town boasts a wall of mud with a few dilapidated gates. The west gate is an oval hole in the wall, perhaps merely the result of a kicking, obstreperous Yünnan mule.

Here we stopped for two days to develop our pictures, pack seeds, and write notes and letters, for Weihsi has a post office, not as we would understand the word, however. The postal clerk was unable to figure out the postage due on my letter package, as he had never con-



THE SNAKY TRENCH OF THE SALWIN RIVER NEAR THE LUTZU HAMLET OF CHJONRA
(SEE TEXT, PAGE 178)

verted grams into fractions of Chinese catties; besides, he had not stamps sufficient to cover postage. So we came to the conclusion that he had better send on the mail to Likiang and I would pay him a certain sum of money which ought to be sufficient. The best of it was that the mail really reached Washington, D. C.

A great part of my time at Weihsi was taken up with ministering to the sick, and the temple grounds where I camped resembled a clinic throughout my stay. All wished some sort of medicine and hoped one dose of the foreign drug would cure instantaneously even the most advanced case of pulmonary tuberculosis; but I could only treat wounds, infected cuts, and bruises. The local remedy for stopping the flow of blood is to put cow dung on the wound.

After leaving Weihsi our goal was Kakatang, only about ten miles distant. It is situated in a narrow part of the valley of the Weihsi stream and consists of log- and mud-houses, alternating with pigsties, all in a single row. We went from place to place, looking for some sort of space which could be cleaned and converted into quarters for the night.

WHERE THE DEAD MUST WAIT FOR LUCKY BURIAL DATE

I spied a dismal temple on the hillside and decided to look it over. The single dirty room, with cobwebbed, smoky gods, contained a coffin which in turn contained a man who had died of old age a year ago and was still awaiting a lucky day for burial.

Not wishing company of that sort, we inspected a fairly decent-looking house and found in it another dead occupant, reposing in a lacquered coffin, awaiting burial at a time when moon and stars should be in the right position in the heavens.

We finally put up in the first house of the village, in a room level with the road. When all were cooking, one might well have used it to cure ham or bacon, for it acted as the chimney of the household.

What sights one can behold in such a place as Kakatang! Nowhere have I seen goiter so prevalent as here. The people carried regular pouches in their throats, like certain monkeys when they fill up with peanuts. One man, half blind, was loaded down with a goiter so huge that the weight of it dragged down his lower jaw, making it difficult for him to keep his mouth closed. He resembled an orang-outang, as he smilingly posed for his picture, leaning on his lengthy pipe.

THE CHIEF LAMA OF CHAMPUTONG LAMASERY

Only one dilapidated temple, tended by four poor lamas, remains of the imposing Buddhist monastery which formerly ministered to this village of 40 slate-roofed houses. After the massacre of French missionaries in 1905, the Chinese burned this and other monasteries to the north (see text, page 179).

INDIAN CORN IN MEKONG VALLEY RAISES PUZZLING QUESTION

From Kakatang we continued our journey through narrow defiles, always following the stream until we reached the Mekong River. The trail was appalling, and often the loads had to be removed from the packs and carried one at a time by the mulemen over the treacherously narrow spots high above the stream.

We followed the Mekong upstream to Petsinhsün, where we stopped for lunch at the home of the headman of the village. When he spied my camera he wished to have his picture taken, and when I agreed he gave orders in a loud, commanding voice to his various wives, who brought out silk garments, which he put on over his filthy clothes, and then sat down as if he were emperor of China.

Our trail led up the Mekong to Tsehchung, on the east bank of the river, some seven days distant.

Strange as it may seem, the most important crop grown by the natives of the Mekong Valley is Indian corn. It is the staple food of the Miaotze tribes, both in Yünnan and Kweichow, and also of the black Miaos in northern Siam. Is it possible that corn was known in Asia before America was discovered? As the aborigines have no written records it is difficult to decide this puzzling question.

NO REST FOR THE EXPEDITION LEADER

When traveling with a large caravan, there are always casualties, especially on such execrable roads or footpaths as one encounters in this part of the world. There is no rest for the leader of an

expedition. After the evening meal, there is much work to be done. A careful diary must be written, exposed photographic plates packed and new ones loaded in the dark, with hands tied into a small changing bag. Plants must be labeled, and when one finally relaxes on a camp cot, the "casuals" arrive. Here is the case of a horse-boy on whose bare foot a mule has stepped; another has a boil, a third fever or a headache.

The number of patients is often augmented by village people, who come with all sorts of ailments till one has to call a halt and, dead tired, refuses to see more visitors. If sent away, the supplicants are sure to come in the early morning, before breakfast.

ROCK-PRAYER PYRAMIDS BESPEAK TIBETAN INFLUENCE

We were still in the land of the Nashi, although one encounters other tribes, such as Lissu and Tibetans.

At Kangpu we stopped at the house of the Nashi chief who rules over this and other villages farther south.

Shortly after our arrival we heard chantings, the blowing of trumpets, beating of gongs, and the ringing of bells, all emanating from a window on the top floor opposite my room. Soon the faces and red cloaks of Nashi lamas appeared in the window frame. They stopped their worship to satisfy their curiosity. Having taken a good look at me, they returned to their prayers with occasional poundings of the drum and monotonous blares from trumpets.

Guided by a lama, I went upstairs to a chapel and found priests sitting before Tibetan books. They were a friendly lot, and later I took their pictures, after presenting them with copies of a photograph of the Dalai Lama of Lhasa, whom some of their number had seen in person and immediately recognized.

The religion of the Nashi in this region is pure Tibetan Buddhism, to which they were converted by their Tibetan neighbors. Tombas, or sorcerers, are rare, if not unknown.

It was here that I encountered the first real Nashi lamas. They spoke Tibetan, besides their mother tongue, and some of them had even been to Lhasa, where they had studied.

Following up the Mekong north of Weihsi, one becomes more and more aware of the fact that one is nearing the Tibetan border. Chinese are very scarce and the tribal people, such as the Nashi, have adopted the religion of the lamas. Beyond Yetche (Yeichih), Tibetans outnumber other tribes. Other signs of Tibetan lama overlordship are the many *mani* shrines, pyramids of rock slabs on which are deftly carved the everlasting formula, *"Om Mani Padme Hum"* (O, the Jewel in the Lotus, Amen).

The pyramid has usually a square base, against the sides of which are slabs of rocks, usually of slate or sandstone, on which, often in minute letters, the prayer is engraved. Hundreds of such slabs of rock compose a pyramid which is crowned by a long, carved pole surmounted by a crescent (see pages 180 and 181).

Seldom does one find a single pyramid. Usually there are long rows of them, composed of thousands of laboriously carved rocks always bearing the same prayer. Occasionally Buddhist emblems, even Buddhas, are carved into the rocks and beautifully painted.

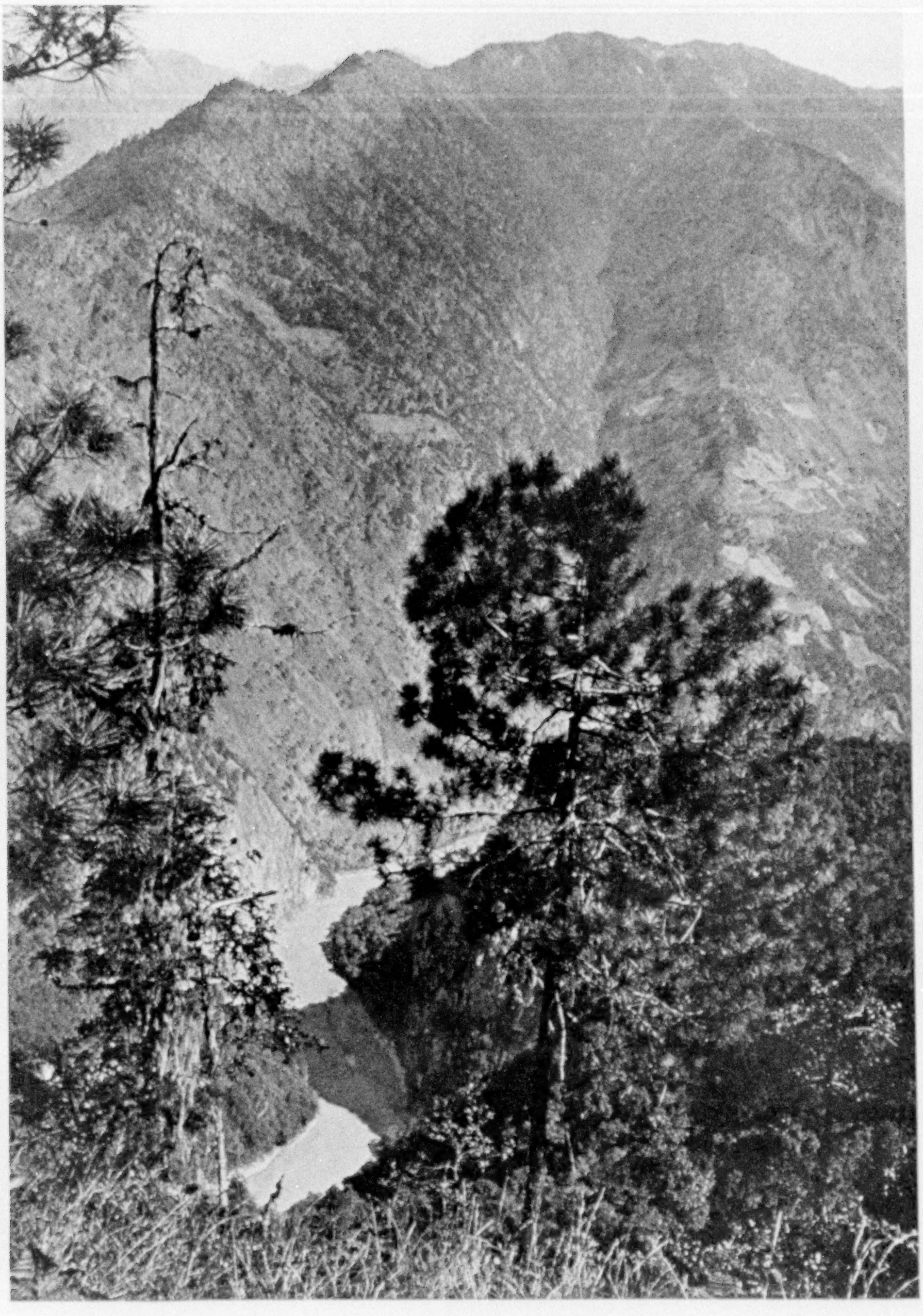
At Kangpu there was a square lama shrine with Buddhas painted on the whitewashed walls, while next to it stood a small incense stove of brick, wherein prayers and cedar- or pine-branch offerings were burnt (see page 160).

In the courtyard of our Nashi chief forgathered many people who later joined my men in the huge kitchen, where fires burned lustily. The sparks were flying, and all at once the black, smoky roof caught fire. Had it not been for the big caldron of boiling water, there would have been no house.

It is remarkable that fires do not occur daily, for the people are absolutely careless. Candles and oil lamps are unknown and the natives walk about with lighted pine torches, some of which are even stuck into cracks between posts, as one would hang up a lantern. If one house burns, it usually means that nothing can save the village.

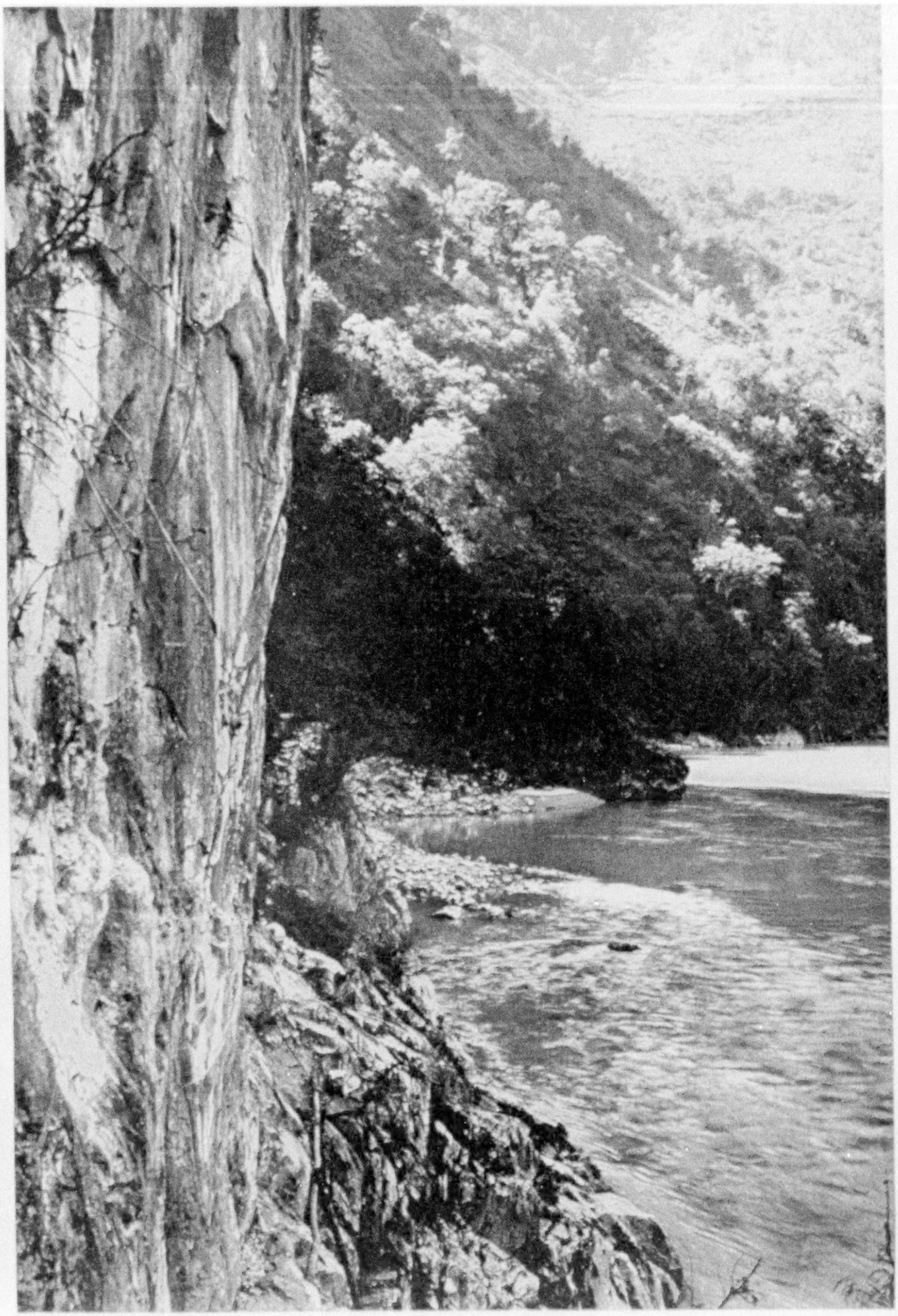
THE LAST OF THE NASHI KINGS BEFRIENDS STRANGERS

Our trail descended from Kangpu to the stream bed, only to lead zigzag over a rocky bluff. Big bowlders projected



THE MARBLE GORGE OF THE SALWIN

Here seen from an elevation of 9,000 feet, this magnificent gorge is about a mile long and rises vertically on both sides, overhanging the stream in many places. In summer the river is churned into furious floods, which jam the gorge and fling about great slabs of marble against the pink, violet, white, and grayish walls (see, also, text, page 179).



THE DIZZY TRAIL THROUGH THE SALWIN'S MARBLE GORGE

The path follows the base of the cliff at the left and is a bare hand's breadth. At one place it consists only of a few sticks, on which the traveler must balance himself above the roaring stream and progress sideways. The Lutzu, however, not only brave the river's current in dugout canoes, but negotiate this perilous trail with heavy loads on their backs (see text, page 180).

in all directions, the crevices being filled with large clumps of orchids.

A few miles more and we reach Yetche, where reigns a Nashi king, whose name is Lee. He is exceedingly friendly to foreigners, and all strangers who pass through Yetche stop with him.

It was he who in 1905 really saved the life of Mr. George Forrest, the botanical explorer. For days Forrest was hunted by Tibetan lamas, who had killed all the priests in the Mekong Valley. Had they caught him, his head, too, would have graced the gate of Atuntze lamasery, as did that of Father Dubernard.

King Lee is very bashful and yet dignified; he is the last surviving ruler of the Nashi as well as of the other tribes living in his territory, which extends as far to the west as the Irrawaddy. Even the Kjutzu pay him tribute, not in money, but in kind.

We spent a day in the king's commodious establishment, occupying a small garden and veranda next to the private lama chapel, for he, too, is of the Tibetan Church.

All day long a lama recited prayers, accompanied by the constant, quick beat of the drum, which was interrupted occasionally by the jingling of a bell. The chapel is closed by massive doors resembling those of a mausoleum, with leopard tails attached to brass rings fastened to the center of each wing.

FRENCH PRIEST SENDS A KINDLY WARNING

The Mekong became more interesting and the scenery much grander, as we proceeded northward.

A contingent of Nashi men, with headquarters at Tsehchung, had been collecting seeds for me on the great divides separating the Mekong, the Yangtze, and the Salwin, and I now sent a messenger to inform them and Father Ouvrard, a French priest, who took the place of massacred Father Dubernard, of my approach.

I was contemplating the unpleasant prospect of crossing the Mekong by a rope bridge at Tsehchung when I was hailed by my Nashi men from the other side of the river at the rope bridge of Tseku. I shouted that we would go on to Tsehchung and there cross the rope, as it was said to be much shorter. I was soon persuaded, however, that it was here I had to cross, as the Tsehchung bridge was three months old and therefore dangerous. The kind Father Ouvrard had sent the men to urge me to use this Tseku rope bridge.

ROPE BRIDGES ARE MADE OF TWISTED BAMBOO

These bridges are an ingenious invention; they can be employed only across rivers flowing in trenchlike valleys, such as the Mekong and the Salwin. Along most of the Yangtze course they are impossible, as the river is much broader and flows in wider valleys, and in regions where they could be used they are unknown to the natives.

The rope bridge, now a purely Tibetan affair, may have been adapted by the Tibetans from the Lutzu, Lissu, or other jungle people of the river valleys near Tibet.

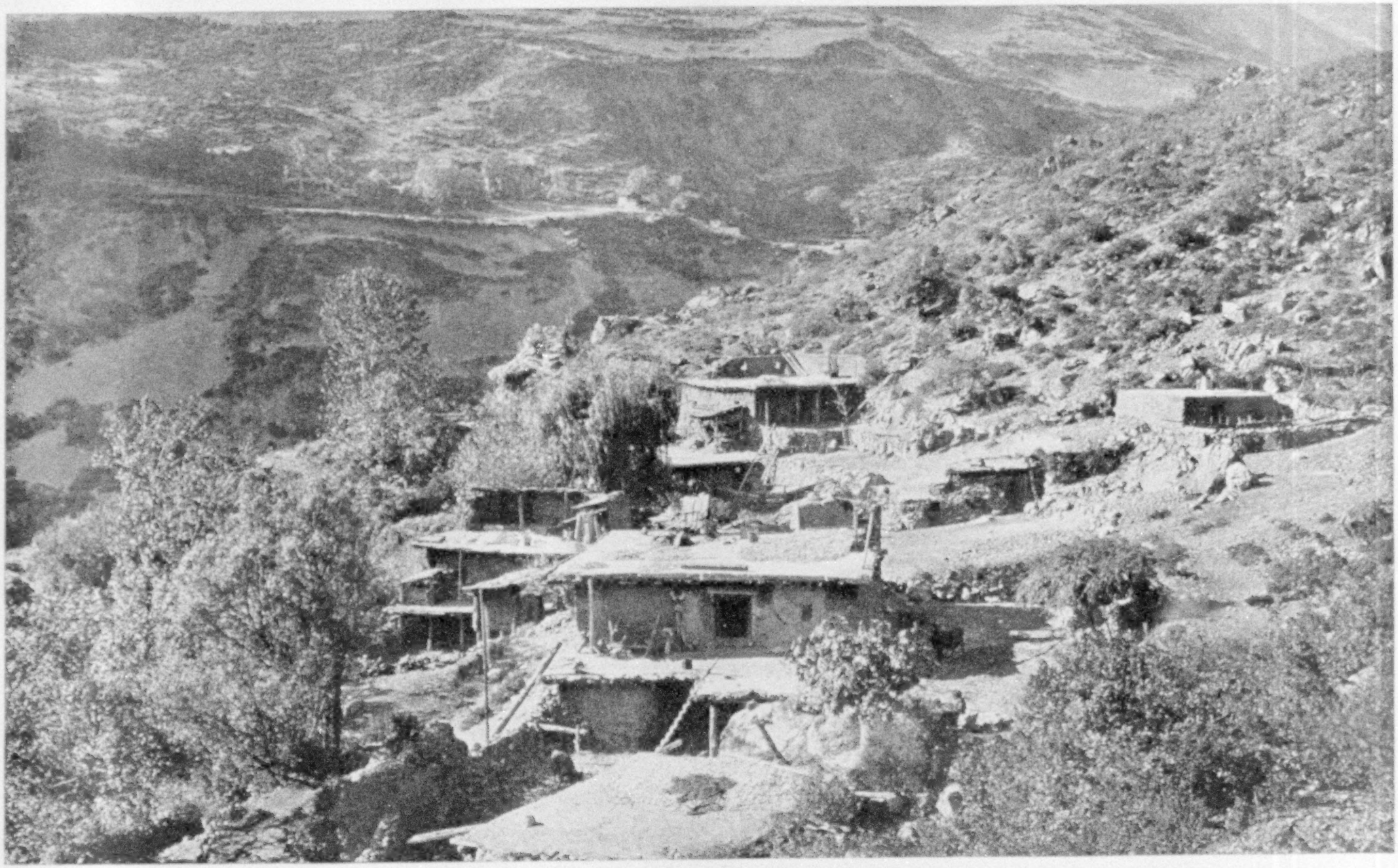
The first prerequisite for a rope bridge is a built-up platform on the hillside near the trail. In this is buried for half its length a large post of cypress in which notches are cut to hold the rope in place after it has been wound round the post (see illustrations, pages 138 and 139).

The starting platform is usually from 100 to 250 feet above the river, while the landing platform, on the opposite side, is from 25 to 50 feet above the river, thus providing a fairly steep decline. There are two rope units for each crossing place, one affording an incline to the right bank and one to the left. The ropes are made of twisted strands of canebrake, a small bamboo (see pages 149 and 150).

A necessary implement is the slider, a semicylinder made of strong oak wood. This slider fits over the rope. The traveler is tied into a rawhide yak strap or sling, in which he sits as in a swing, and this is fastened to the slider through a wooden slot. Care must be taken to keep the slider straight, back up, on the rope.

THE FIRST ROPE-BRIDGE CROSSING CAUSES GREAT ANXIETY

I had not anticipated crossing here and hoped to have one more hour's grace. It was a bit difficult to make up one's mind. My Siamese boy was even more fearful than I; in fact, he had worried about the prospect from the day we started on this memorable trip.



TIBETANS OF THE MEKONG DRY THEIR CORN ON FLAT ROOFS

"The villages here reminded me much of those of Hopi Indians of the American Southwest, with their flat roofs on which yellow Indian corn is dried" (see text, page 185). It is possible that corn was known in Asia before the discovery of America, since it is the staple crop in the Mekong Valley. The aborigines have no written records, however, which solve this question (see text, page 163).

ATUNTZE NESTLES IN THE SHADOW OF SNOW-CAPPED PEIMASHAN

Though conquered by the Chinese in 1703 and annexed to Yünnan, Atuntze remains essentially a Tibetan town and was formerly a trading center, where the people from the northern steppes bartered merchandise with the Chinese. Its name signifies "Beacon Hill," since the mountain beside it made an excellent lookout station. The lamasery occupies the elevation to the right (see, also, page 170). "The White Horse Mountain," the mighty range in the distance, separates the Mekong from the Yangtze.

COURTYARD OF THE ATUNTZE LAMASERY

A lama is posing before the yak-hair curtain of the temple, which forms one side of a small paved court. Formerly one of the most important lamaseries in Tibetan frontier lands, this establishment now contains only 200 monks.

Some of my Nashi men had never been across a rope bridge, and although they did not utter a word of protest, I could see that they would have preferred to stay where they were. As I had, however, decided to cross the ranges to the Salwin and climb the Salwin-Irrawaddy divide, there was no way of escape, and swing across we must.

In order to be able to take photographs of the actual crossing, I asked two men to go first; then I proposed to send over my two horses, after which I would follow.

The starting platform was about 200 feet above the river, in which were terrific rapids only 100 feet beyond the bridge, and the rope sagged heavily from its own weight. The prospect of being suspended from that rope above a roaring river was enough to set me thinking!

We had no slider, nor the necessary sling which every resident of this valley carries over his shoulder, so that he or she can cross at any place desired.

The headman of the village of Tsehchung, who had come with pack-mules to take our trunks and boxes on to the village, now left his mules grazing on the opposite hillside and came across, sliding in great shape, with all the spare slings at his command tied to his waist.

I had the rope tightened, as I feared to land in the middle of it, suspended over the river, as happens to many of slight build and weight. When such a misfortune occurs, the traveler must perforce pull himself hand over hand up the incline on the other side.

Before the trip is attempted the slider must be greased with yak butter, and, as

there was none on our side, we had to send the headman back for a supply.

YAK BUTTER IS USED TO GREASE THE BRIDGE

He tied himself in the lengthy sling and slid across without ado, and soon returned with butter and a bamboo tube filled with a greasy liquid, which he poured on the rope in front of his face while crossing.

It came my turn to go. The only unpleasantness I now recall is the preliminary of being tied on. I would compare this experience as the administering of the anesthetic before an operation.

As soon as I was tied to the slider, over which I folded my hands, the headman took me by my coat-tails and gently slid me to the edge of the platform. I was then suspended for a moment over the tops of the trees which grew on the steep bank.

With a last word of advice to hold my head away from the rope, there was a yell of "Let go!" and off I shot, far into space, at the rate of 20 miles an hour.

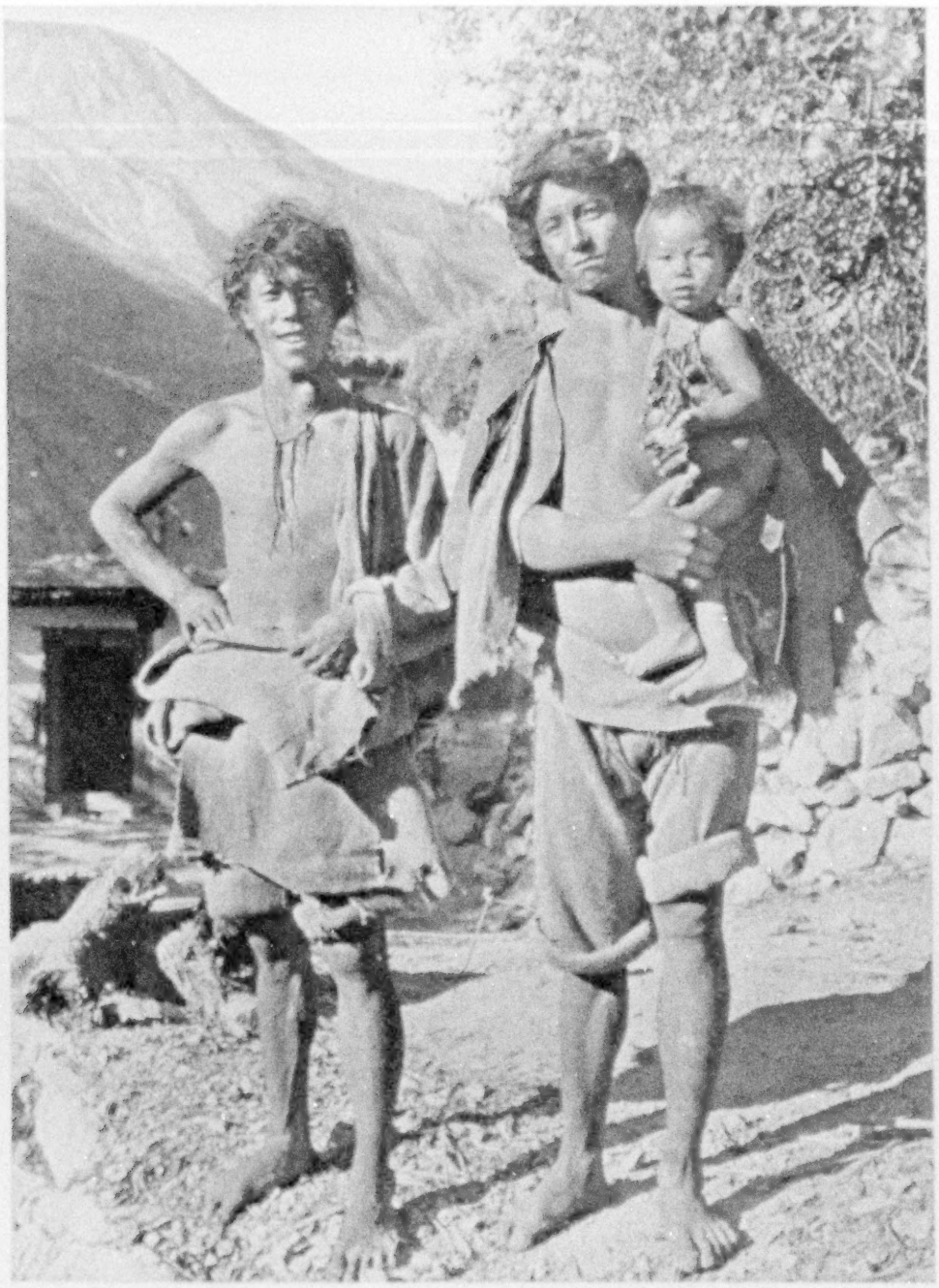
A glimpse of the roaring river far below me, a smell as of burning wood, caused by the friction of the slider, which raced over the unevenly braided, bumpy rope, and I landed, like a heavy mule, on the rocky west bank of the river.

My horses were terrified when their turn came, and when dangling helplessly in the air above the river they kicked with all their might, mouth open and tail up (see page 150). When they arrived on the other side they lay down on the rocks, too frightened to stand.

After about three hours all my men, as well as my baggage, were safely landed.

It was a great relief to be across and have it over with, but thereafter I must confess I actually enjoyed sliding over rope bridges whenever I was assured they had not seen too long service.

A rope bridge is a community affair and in this region costs the equivalent of about $3, the village paying for it. Its period of usefulness at an ordinary crossing, not subjected to heavy traffic, is about



THE TIBETANS OF THE ATUNTZE VALLEY ARE FRIENDLY FOLK

The Mekong Tibetans, especially those living in the arid region beyond Atuntze, are stalwart and hard-working. They dress lightly, even in winter time, for it is always warm in that dry trench. False hair or cotton thread is braided into their long queues, which are then threaded through a ring of elephant ivory and wound around the head. The lowering of the queue is a sign of greeting.

A MOMENT'S REST FOR THE WEARY

These pilgrims to the Dokerla have come from Kham, the easternmost province of Tibet, whose people are said to be the most robust of all Tibetans. Some will obtain emancipation and deliverance from rebirth by throwing themselves down the sacred mountain (see text, page 186).

three months, while at Yangtzà, a village two days to the north, the bridges—of which there are three, two for coming, one for going—are changed every three or four days, as they are used by hundreds daily during the last three months of the year, when thousands of pilgrims come from Tibet, only to return again by the sacred Dokerla (see, also, text, page 185).

Father Ouvrard told me an amusing story of a Tibetan woman who had quarreled with her husbands and wished to leave them, but could not find a slider, as her men had hidden it. Not to be outwitted, she obtained a curved cane, like a walking-stick, hung the crook over the rope while she clung to the other end and sailed forth across the bridge, much to the chagrin of her husbands.

At Tsehchung I was hospitably given a room at the mission.

I now made preparations for my journey to the Salwin. With the kind help of Father Ouvrard, who had been some 14 years at Tsehchung, I hired 13 porters, Nashi, Lutzu, and Tibetans, and off we started one cool morning. We left our caravan behind and took with us only riding horses, beds, provisions, plenty of warm clothing and blankets, and all necessary photographic equipment.

ON THE TRAIL TO THE SALWIN

The trail led back toward Tseku, but before reaching that village it ascended steeply the enormous mountain slope at a terrific angle. It was exceedingly narrow and zigzagged through scrub oak and pine forest over rocks and bowlders.

A glorious view unfolded. Far below us roared the Mekong, with the rope bridge of Tseku faintly visible in the distance; to the east, rose the massive Peimashan range, which separates the Mekong from the Yangtze (see page 169).

As we ascended we emerged from pine forests into a deciduous growth of wild cherries, maples, and rhododendrons, with here and there a sumach.

Narrower and narrower became the trail, almost invisible on the steep mountain side, leading finally to the top of the first preliminary ridge, some 10,500 feet above sea level.

SHEEP PILGRIMS TO THE DOKERLA

Many pilgrims to the Dokerla take with them their mountain sheep, which are used as pack animals to carry meager provisions of barley flour in woolen saddlebags. They are sacred after they have been across the Dokerla and are never slaughtered for meat, but are allowed to die a natural death. After their pilgrimage they are identified by means of red tassels threaded into their ears.

Magnificent scenery surrounded us: far below, the mysterious Mekong in its V-shaped trench; to the west cloudless Sila (Si Pass), the actual Mekong-Salwin divide, now with little snow; in front a deep, circular valley dissected by a torrent rushing madly toward the Mekong through a ravine.

We were as in another world, overlooking a forest of fir trees (*Cunninghamia*) with mighty trunks and more than 150 feet in height. Great birch trees reared their crowns among the firs, forming a lovely canopy of foliage 90 feet above the ground.

It was the finest rain forest I had ever seen. A mossy carpet covered the ground and yellow, beardlike lichens festooned the giant trees, while silvery-leaved rhododendron trees formed the undergrowth.

All was in autumn tints, the maples golden yellow, others crimson, while the bronze-colored, glossy bark of the birches, rolled up in wads on the massive trunks, glistened in the morning sunlight, all the foliage becoming translucent and contrasting beautifully against the somber firs.

CAMPING AT AN ELEVATION OF 10,500 FEET

Through this hallowed shrine of trees we descended, across crystal brooks bordered by red-flowered balsams, ferns, and orchids, over an alpine meadow surrounded by tall conifers, with peaks rising thousands of feet above us.

On we wandered through a more open forest of rhododendrons and birches, following a glacial stream to our camping place for the night.

I had hardly sat down on a bowlder to write my notes on the vegetation when two tiny birds paid me a visit and calmly sat down on my hand holding the pencil, chirping a line of greeting in utter fearlessness; then off they flew again into the woods.

A brilliant sunset over the snowclad peaks closed our happy day. The sky

THE TIBETAN PRAYS BY WATER POWER

The mechanical repetition of the sacred formula, "O, the Jewel in the Lotus, Amen," is believed by devout Tibetans to lay up comfort in this life, to assure happiness after death, and to prevent them from being reborn in a lower scale. Accordingly, the prayer is written on yards of paper and placed in prayer wheels, or cylinders, which are frequently turned by water power. Each revolution repeats the prayer as many times as it is written on the paper.

was cloudless and the near-full moon shed a silvery light over the landscape. Our camp was at an elevation of 10,500 feet, and starry nights at such a height are icy cold.

CAUGHT IN A BLIZZARD AT 14,500 FEET ELEVATION

A steady climb brought us to the foot of the Sila, a regular paradise of rhododendron; one could gather more than a hundred species on this range alone. To the right of us was a snowclad overhanging pyramid some 16,000 feet in height; to the left a circular wall of gray limestone with pinnacles and turrets.

The sky now blackened and a snowstorm raged among the peaks. The trail, mere hookmarks over the bowlders, became very indistinct and could be located only with the greatest difficulty, although not sufficient snow had fallen to obliterate it. But by the time we reached the actual pass, at 14,500 feet above the sea, the gentle snowfall had become a furious blizzard. An icy wind howled across the divide, blowing from the west.

Glad to turn our backs on this bleak, inhospitable spot, we descended over a steep, well-constructed trail which extends all the way to Bahang, two days distant. It had been made by missionaries, who employed Lutzu tribal people over a period of five years, each laborer

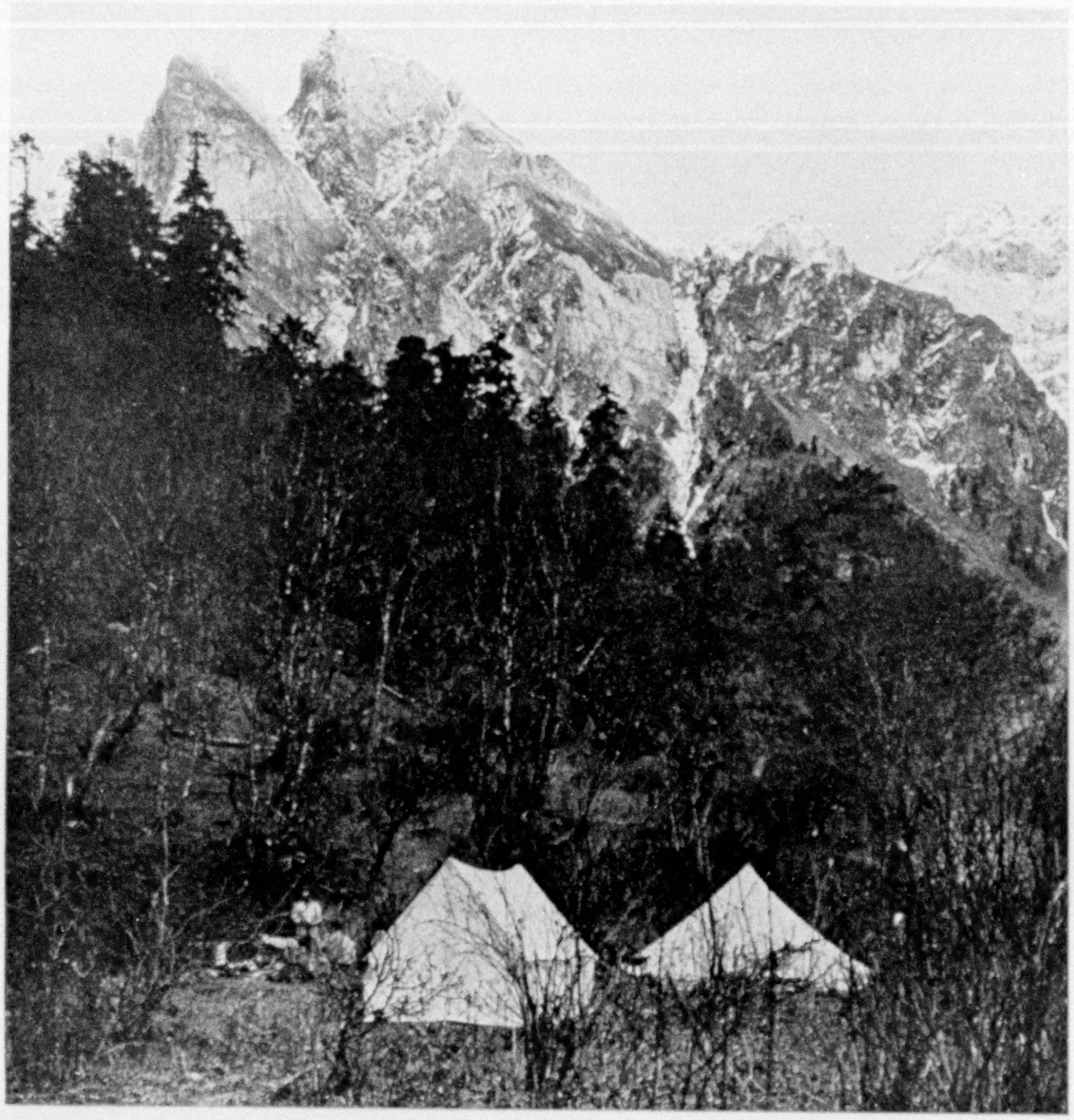
THE AUTHOR AT THE SUMMIT OF THE SACRED DOKERLA, MECCA OF TIBETAN PILGRIM THRONGS

This celebrated pass attains an elevation of 15,000 feet. A constant stream of pilgrims treads the narrow trail with the Buddhist prayer on their lips. Prayer flags strung on poles have been left to attest piety. Many devotees also hang their queues on tree branches as additional offerings.

receiving three cents per day and supplying his own food.

At the foot of this enormous range flows the Sewalongba, a tributary of the Salwin, and on its bank we camped in a substantial one-room stone house erected by the missionaries. It afforded us grateful shelter on a night as cold, if not colder, than the previous one, 4,500 feet higher up.

The Salwin in the rainy region has two parallel tributaries flowing in deep, V-shaped trenches; these must be crossed before the main stream can be reached. We had crossed the first of these, the Sewalongba, but there still remained the Doyonlongba to be negotiated, and the following morning found us on our way, climbing to the summit of another pass. Snowfields of a faint pink were illuminated by the rising sun, while the deep ravine lay buried in purplish black



THE EXPEDITION'S CAMP BENEATH TSARÜNG'S PEAKS

It took eleven days to cross the sacred Dokerla in order to photograph the glorious Kaakerpu Range from the fastnesses of the Tibetan State of Tsarüng, whose forests consist of magnificent fir, birch, maple, and rhododendron, with tropical species in the Salwin Valley.

shadow, with here and there faint, misty rays passing diagonally across the projecting spurs, reflections from the snow peaks.

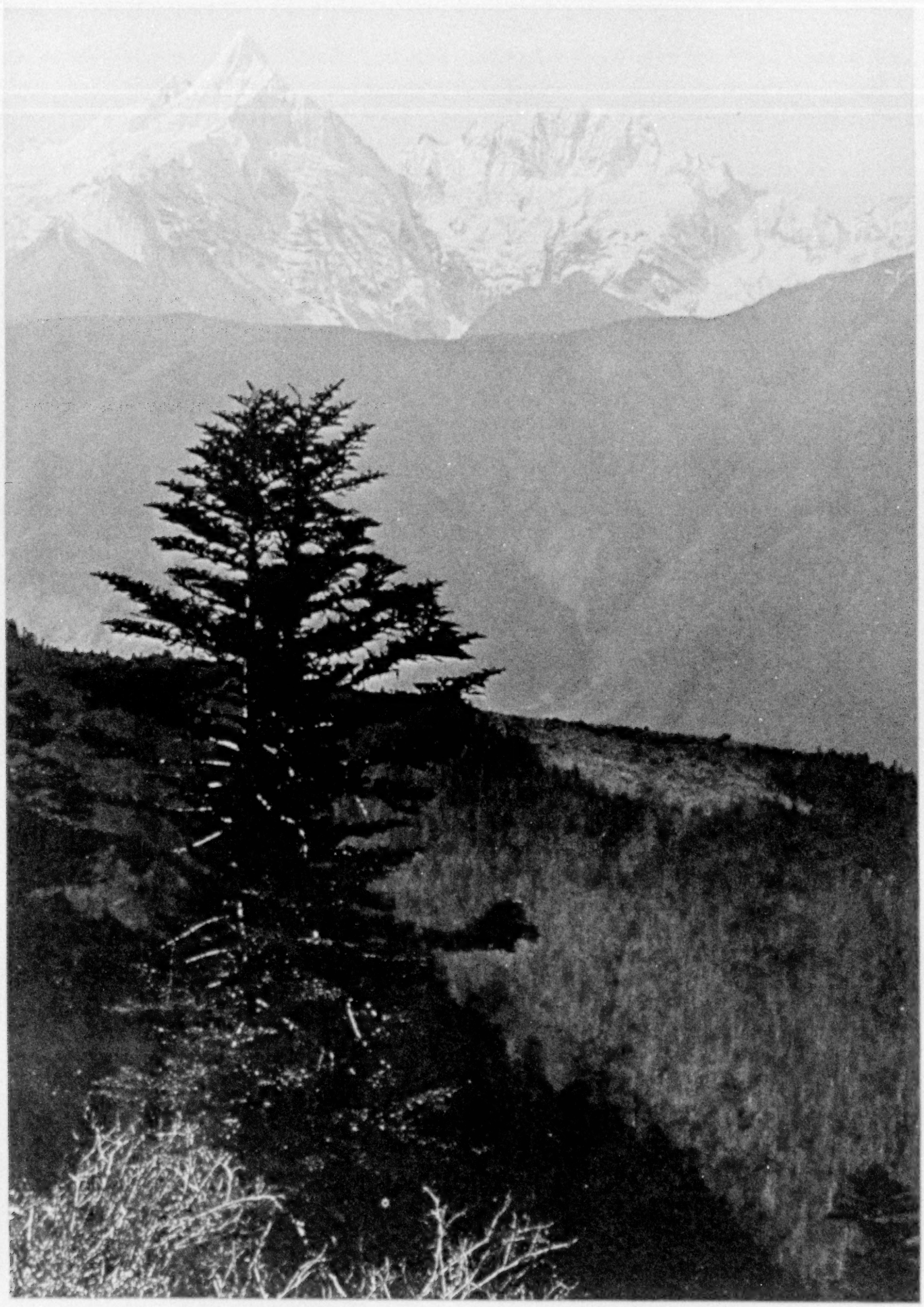
A flood of light permeated the forest as the sun appeared over the great divide, the frost and icicles glistening like diamonds.

We reached the pass at 13,000 feet elevation, where a matchless panorama spread before us. We could overlook the Salwin Valley, while beyond rose a mighty range separating the Salwin from an eastern branch of the Irrawaddy.

Tantalizing, fleecy clouds kept hovering over the snow peaks and glaciers, permitting only occasional glimpses through the rifts. To the east lay the great Salwin-Mekong divide, and, looking up to the snow-covered crest, it seemed incredible that one could descend such steep mountain walls.

THE LAST OUTPOST OF CHRISTIANITY

Once more we descended through beautiful fir and spruce forests, deep down into the valley of Doyonlongba, where, on a bluff at 8,200 feet, is situated the



MIYETZIMU'S PEERLESS CREST IS THE GLORY OF THE KAAKERPU RANGE

These gorgeous peaks of the Salwin-Mekong divide have never been surveyed nor their heights accurately determined, but Miyetzimu, monarch of the Kaakerpu Range, is thought to have an elevation of 24,000 feet (see text, page 185). It is best seen from Mount Drungu, west of the village of Atuntze. The trees in the foreground are a species of fir.

HE LEADS THE PILGRIMS TO THE SACRED DOKERLA

In a small leather bag inside his sheepskin coat he carries a meager ration of roasted barley flour.

last outpost of a Christian mission, the Tibetan Bahang or Pehanlo of the Chinese.

To me this is the loveliest mission station of which I know. Here lives, all alone, a young priest, Father André, who fought through the World War, from the very beginning to the bitter end. Now, in this remote spot, he has time to reflect on the futility of it all. From November until May, when the passes are filled with snow, he is completely isolated from the rest of the world. No letters reach him during that time. Two days north of him is the forbidden land, Tibet, and two days to the south the treacherous Black Lissu land.

There are 18 huts at Bahang, situated around the hill, on top of which the church and mission stand. Twice it has been burned by the Tibetan lamas of Champutong, and twice intrepid Father Genestier, who still lives in the Salwin Valley, at Tjonatong, had to flee for his life and find shelter among the Lissu farther south. He is the only survivor of the massacre of 1905.

The Lutzu who inhabit this stretch of the Salwin, and whose spiritual adviser Father André is, are a poor lot. They live solely on corn, their staple food, which they use for making a liquor of which they drink a great deal.

TIPSY FEASTERS ACT AS FERRYMEN

We enjoyed the hospitality of Father André, who freely shared his vegetable garden and his larder with us. It was hard to say good-by and leave him to wrestle with the coming winter, surrounded by primitive Lutzu.

We descended to the Doyonlongba and climbed the next divide, a broad, bracken-covered ridge bordered by forests of magnolia, oak, and birch, and finally reached Chjonra, a scattered Lutzu hamlet on the Salwin. Not a soul was visible, but a moaning sound and speech as if from a hundred mouths issued from the last house nearest the river. The whole village had assembled here to celebrate a sale. A woman had been bought to become one of the many wives of a Lutzu man.

All were gloriously drunk; but, notwithstanding their condition and the feast, they offered at once to ferry us across the

broad, swift-flowing Salwin.

There were several dugout canoes on the sandy beach, but only two were serviceable, and these were almost as tipsy as the 14 men who comprised the crews.

A rope bridge spans the river here, but I preferred the drunken Lutzu to the old rope (see page 141).

Our oarsmen would row upstream into the center of the current, then pound the sides of their canoes with their long, narrow paddles, give a few yells, and allow their craft to drift swiftly downstream, and then paddle out to the other bank.

All our belongings were taken safely across, but our horses had to swim the icy waters.

Following the narrow trail through buckwheat, we reached Champutong, within sight of the mighty glaciers of the highest peak of the Salwin-Irrawaddy divide. Here the scenery is really tropical, and it is a different world entirely from that along the Mekong, only a few miles distant as the crow flies.

A LAND OF MECHANICAL PRAYER

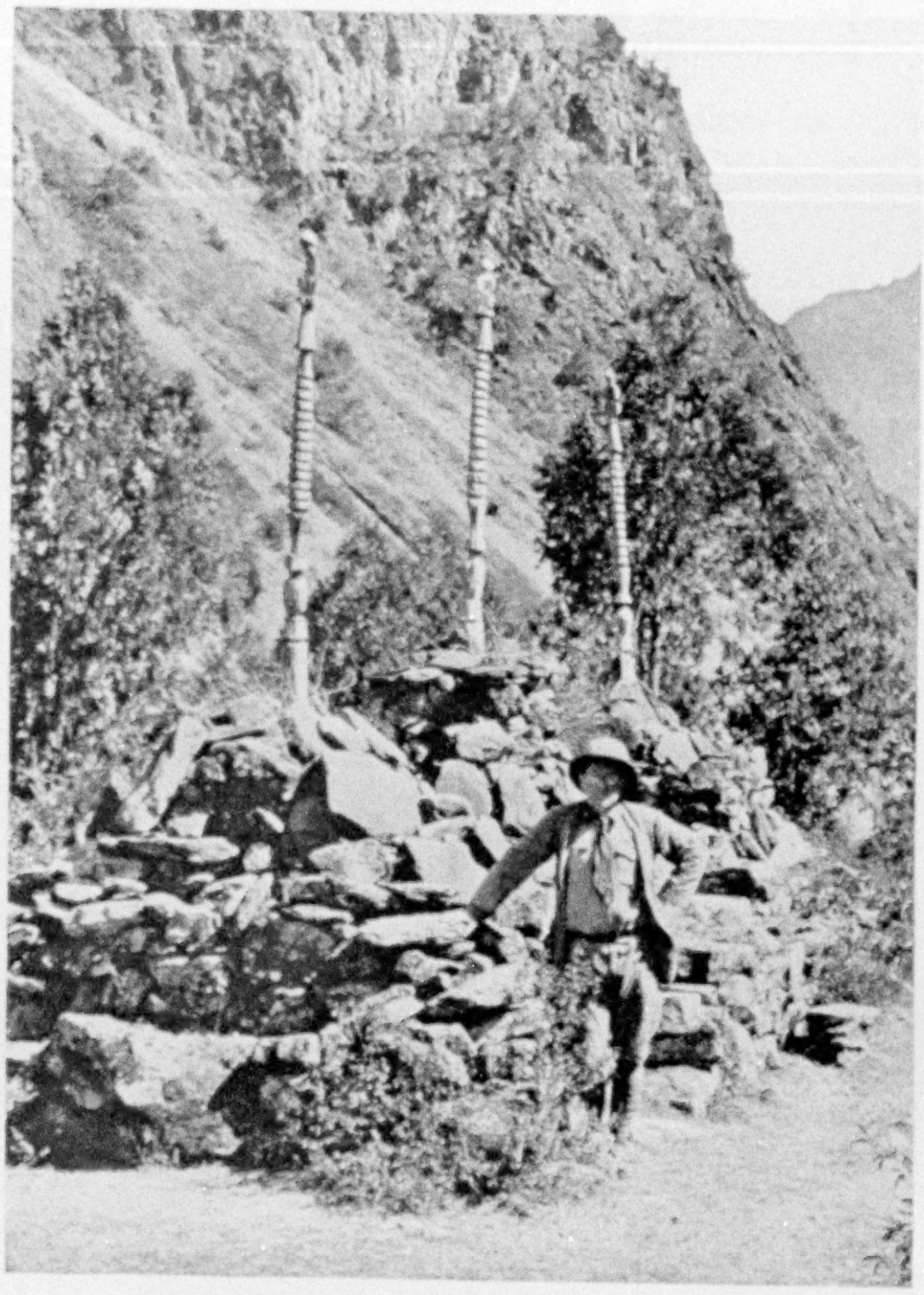
In the Tibetan villages of Yünnan, as in Tibet itself, sacred Mani pyramids line the roads in great piles. Some of the stones are many feet high and represent years of labor spent by lamas in carving and placing them (see text, page 164).

BUDDHIST MONASTERY DESTROYED BY AVENGING CHINESE

For months we had collected plants on all these ranges, from the tropical valley floors to the highest alpine meadows up to 18,000 feet and higher, depending on the particular divide. Now the seeds were ripening, and we were busy collecting those of economic as well as ornamental plants, such as rhododendrons, to be found in this botanically rich area.

Champutong is a village of forty scattered mud houses, roofed with huge slabs of slate. It is situated on a high alluvial fan or plain deeply cut by two streams which flow into the Salwin. Before 1905 an imposing Buddhist monastery stood in a grove of oak trees, but after the massacre of the French priests in that year the Chinese retaliated and burned down this as well as the Atuntze and other monasteries to the north. The Champutong temple alone remains, in a more or less dilapidated state, tended by four poor lamas (see page 163).

From the temple we made our way to



MANI PYRAMIDS AT LONDJRE

On his return from the Salwin the author found this canyon-cradled Tibetan hamlet deserted. In this region, Tibetan influence was apparent in the numerous Mani shrines, or pyramids of rock slabs on which the Buddhist prayer is carved. Carved poles surmounted by crescents crown the pyramids.

the magnificent marble gorge through which the Salwin has cut its way, the walls rising vertically hundreds of feet on both sides and in many places overhanging. Here and there on the face of the marble cliff a fan palm rears its small crown of leaves on a slender stem.

Well within the gorge the trail is a bare hand's breadth and in one place consists of a couple of sticks, on which one has to balance oneself with toes pointing to the wall and hands against the cliff, going sideways like a crustacean, while the river roars below. And yet the Lutzu negotiate this trail carrying heavy loads (p. 166).

The next day we climbed the Salwin-Irrawaddy divide to get a photograph of the highest peak, Mount Kenyichunpo (about 20,000 feet). One might climb the ridges opposite the mountain every day for many weary weeks and always find the peak shrouded in clouds. October and November are the only months when there is a chance to see it cloudless, and even then only at rare intervals.

The gods favored us. It was a crystal-clear morning, and we hastened higher and higher, ever watching the peerless peak, which that day remained sharply outlined against an azure sky (see illustration, page 184).

THE HOME OF THE BLACK RHODODENDRON

The glaciers lay crescent-shaped before us and a deep, narrow, forested valley, with precipitous cliffs, opened out into the Salwin beyond the marble gorge.

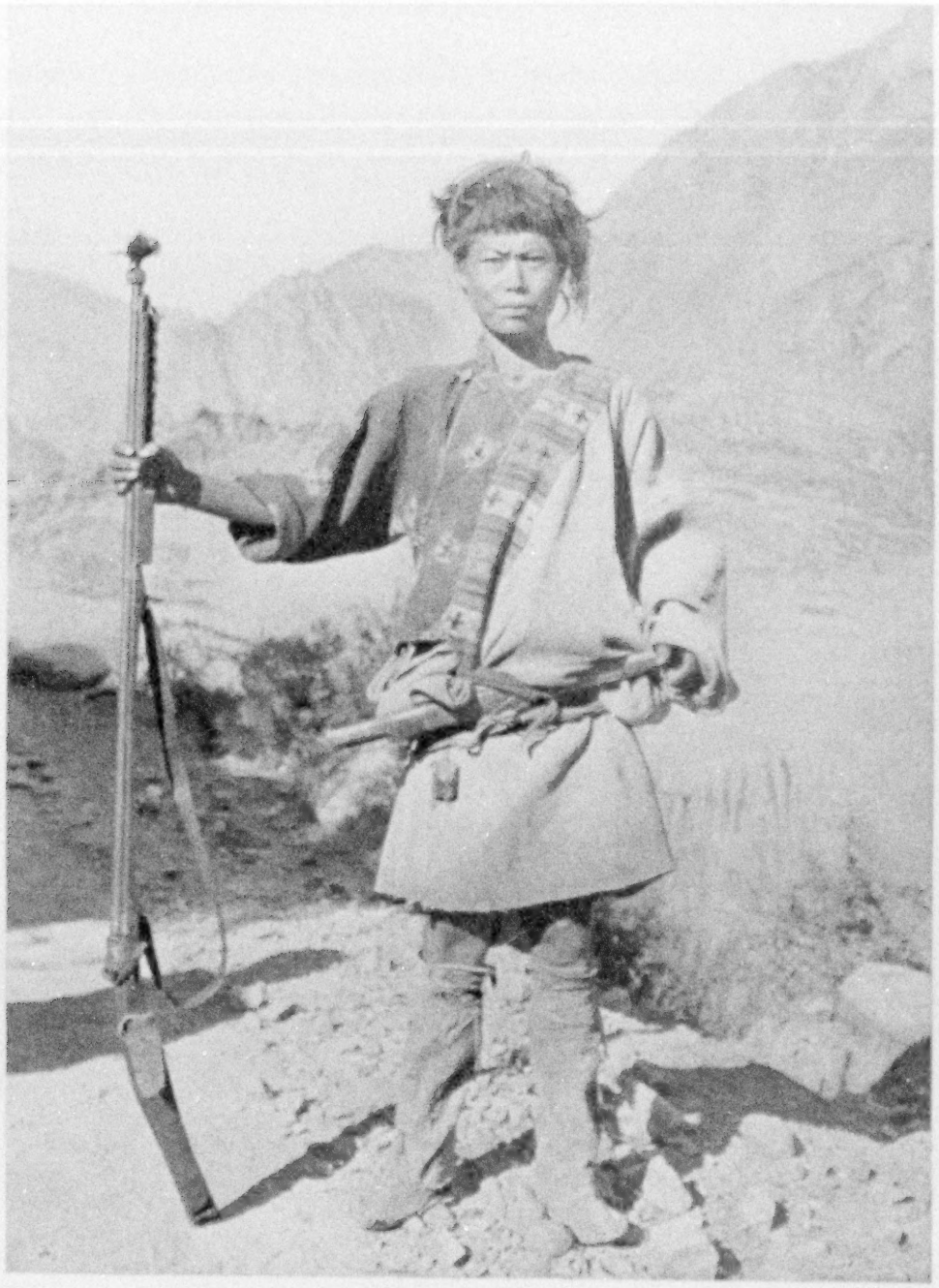
Up this valley leads a perilous trail for three or four days' march over snow-clad passes to the Nmaihka, an eastern branch of the Irrawaddy. The region is as yet an unexplored, virgin field for botanist, geographer, and geologist.

The Lissu, wildest of the tribes to be found in Yünnan, have settled in this vicinity. Like the Lutzu, they are dexterous in the use of the crossbow and are skillful hunters. Every little boy carries his bow and arrow and every living creature, from the smallest bird to the bear or traveler, serves as target. Their arrows are very strong and the points are poi-

soned with the root of aconite. This undoubtedly accounts for the few birds one finds in this romantic region, which should swarm with feathered songsters.

It is here that the black rhododendron flourishes on lonely alpine meadows, among lovely primroses of indescribable colors.

Across the divide is the home of the Kjutzu, a primitive, harmless jungle people who, the Chinese say, live in trees like monkeys.



HE ESCORTED THE AUTHOR TO THE DOKERLA

The breast of his coat serves as a pocket for carrying food and a variety of miscellaneous articles. His felt boots are soled with leather.

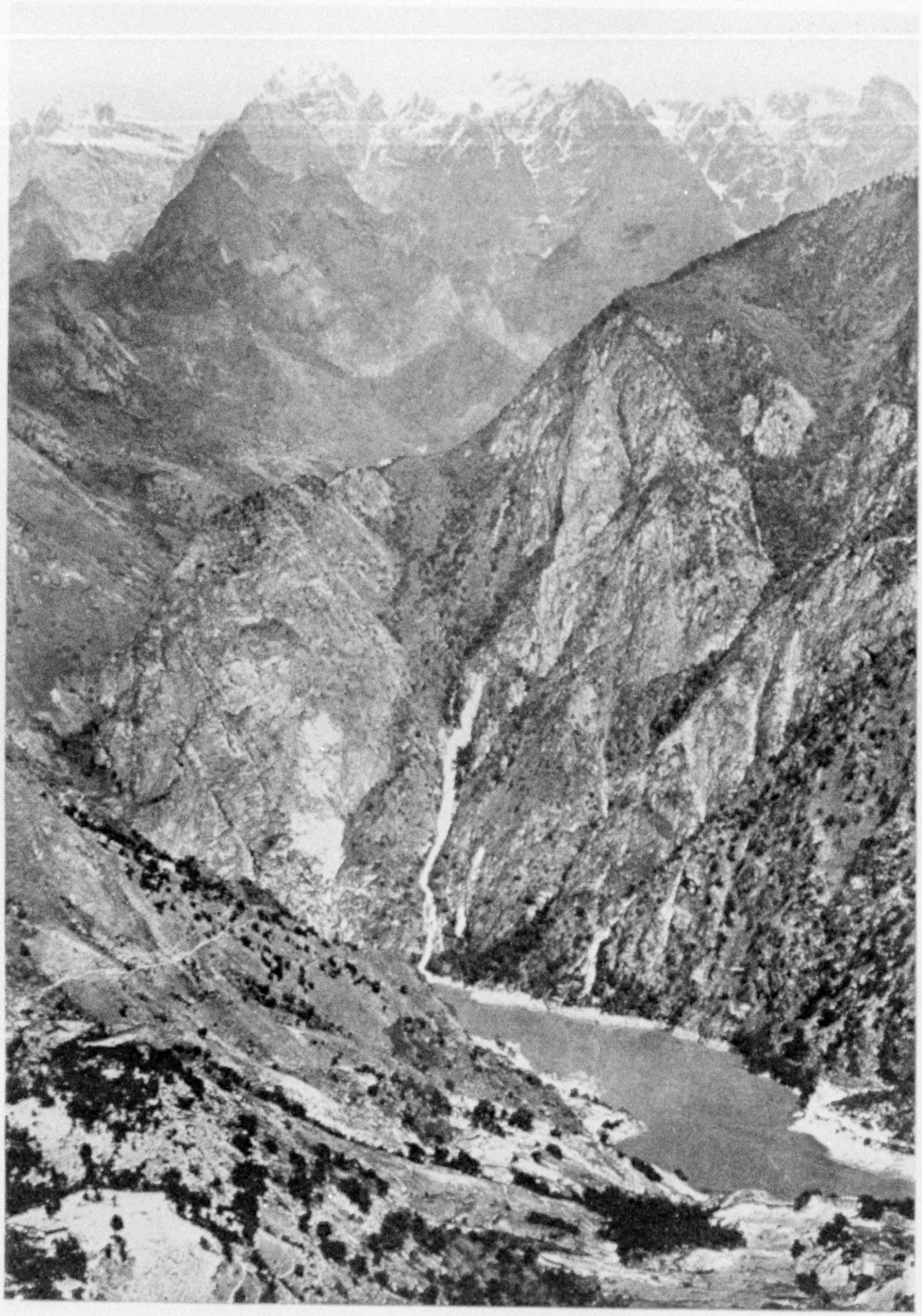
HURRYING AHEAD OF WINTER SNOWS

Enriched with large collections, we returned to Champutong down a perilous grass-covered ridge, where we climbed by hand and foot, for the grass made our shoes so slippery that it was impossible to walk erect. A misstep would have landed the unfortunate traveler thousands of feet below, in a rocky river bed.

We had to hasten now, for winter was approaching. We left Champutong by glorious moonlight, long before dawn of October 28. Through the deep ravine we picked our way along the narrow, rocky trail, high above the Salwin River bed, which was filled with snow-white clouds. We reached Tjonson and crossed to Chjonra in the dugouts, after signaling to our Lutzu friends with revolver shots, for they were sound asleep. We camped that evening deep in the forests of the Doyonlongba.

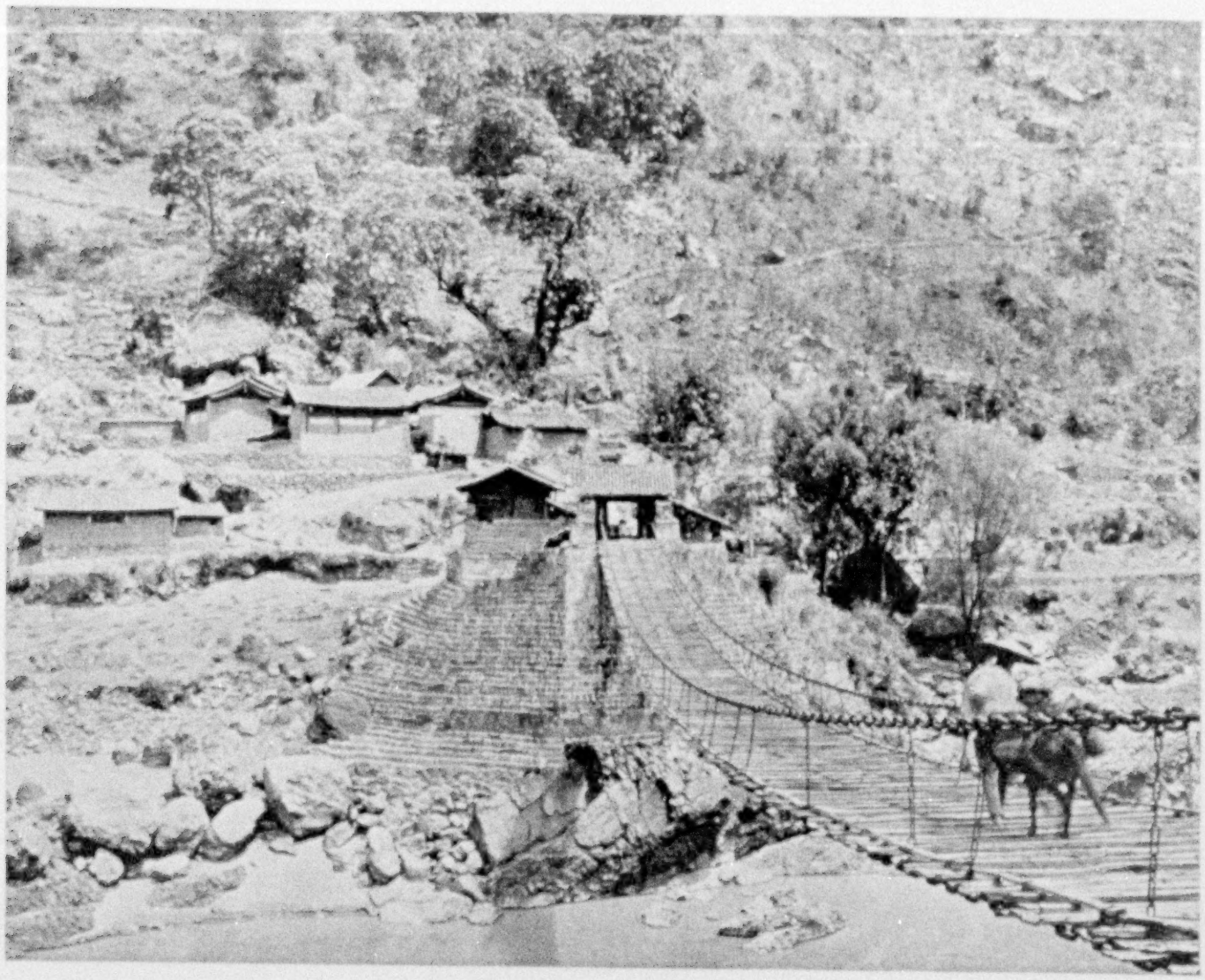
In clearest weather we followed the stream through virgin walnut forests, some of the trees being 80 feet tall. The ground was literally covered with the large, round walnuts, but the shells were so thick that an anvil and sledge-hammer were needed to open them.

After a wonderful night in a glorious forest of rhododendron, maples, firs, and spruces, we left our camp in bright moonlight and climbed higher and higher, until about noon we reached the pass which leads to the Mekong Valley. To the right stood a fantastic peak 15,000 feet in height. Far in the distance loomed the high peaks of the Hungpo Mountains, a part of the Mekong-Yangtze watershed. To the north a deep valley opened, and we followed this through a magnificent forest of rhododendron trees.



THE LIKIANG GORGE OF THE YANGTZE SEEN FROM THE LOYÜ TRAIL

"The cliffs rise steeply on both sides, culminating in jagged crags and pinnacles, and above these tower the ice-crowned peaks of the Likiang snow range" (see text, page 186). The main peak of the Dyinaloko Range, the mountain mass in the background, is not visible.



ROMANCE BUILT THIS BRIDGE OVER THE YANGTZE AT TSILIKIANG

This swaying footpath, supported by 16 massive chains, is the result of a lover's predicament (see text, page 186), who, contrary to Chinese custom, eloped.

We spent one night along a glacier stream in rhododendron woods. Here our Tibetan guide from the Salwin left us, as he was afraid to venture down to Londjre, a Tibetan hamlet deep in the canyon, where it was said a pneumonic plague had raged and all the survivors had fled into the hills.

When we arrived at the village we found that it was deserted, many having died, not of plague, but of relapsing fever, a disease carried by lice, which are the constant companions of the Tibetans. Once the disease gets well established, it seems to go on forever, as there is hardly a Tibetan who does not harbor some of these small boarders.

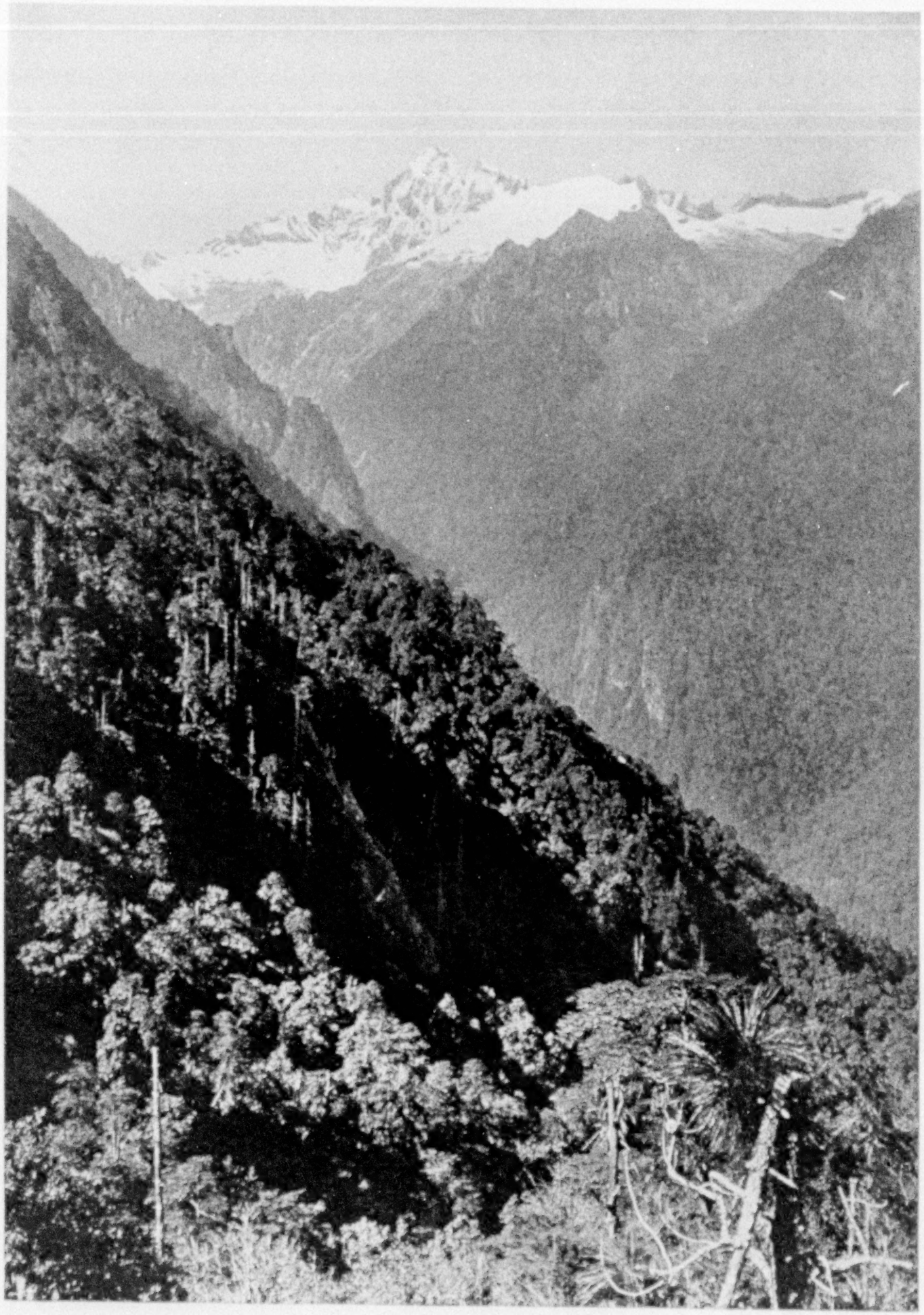
We now followed the arid, rocky gorge of the Mekong. The snowy dome of Mount Miyetzimu looked deathlike in the cold, gray morning sky, but turned to a rich pink when the sun's rays were reflected from its steep snowfields.

We reached Yangtzà, a busy place at this time of year, for thousands of pilgrims cross here to visit sacred Dokerla. As we approached, Tibetans kept sliding on rope bridges to our side, while another caravan, mostly composed of women, went the other way. There was a constant sliding back and forth from bank to bank, just as people of the Occident cross streets.

The terrific gorge of the Mekong engulfed us and our caravan looked like mere dots on the narrow trail, against the huge cliffs.

It is best to negotiate the narrowest parts of the trail before 10 a. m., as later in the day terrific gusts of wind howl through the arid canyon, making traveling unsafe. One man was killed recently by falling rocks dislodged by the force of the wind, and he still lies buried under the bowlders where the accident occurred.

So dry and arid is the gorge and so hot the wind, that traveling is a real hardship for both man and beast.



MOUNT KENYICHUNPO, ON THE YÜNNAN-TIBET BORDER

This is the loftiest peak of the Salwin-Irrawaddy divide, as seen from an elevation of 10,000 feet above Champutong. It reaches a height of approximately 20,000 feet (see text, page 180).

People in this part of the world much prefer tea and salt to cash as a means of exchange. Money has no real value, for towns are far removed and nothing can be bought.

The Tibetans we met were all friendly, greeting me with uplifted hands to show that they concealed no weapons, and when one wanted to be very humble he stuck out his tongue and, with thumbs pointed upward, smiled.

Along this stretch of the Mekong one sees many mud watchtowers, erected some 500 years ago by a Likiang Nashi king. The villages here reminded me much of those of Hopi Indians of the American Southwest, with their flat roofs on which yellow Indian corn is dried. For ladders a notched log suffices (see page 168).

Of all the trails along which we had passed thus far, none could compare with that which leads from Londjre gorge out into the Mekong. It is a veritable corkscrew up a weird black chasm, at the bottom of which roars the stream coming from sacred Dokerla. The trail is built against a rocky wall of sandstone in short, steep zigzags, a most appalling structure of tree-trunks suspended over the deep, narrow, yawning black canyon with overhanging cliffs. A gale was blowing in addition, which meant that at every turn one had to brace oneself against the wind, holding on tightly to the cliff.

Through a narrow gap we eventually emerged once more into the Mekong Valley, with the river far below.

Our trip to the Salwin had taken just twelve days. We now entered a still deeper and more terrifying canyon, absolutely barren, through which the river wound in long loops, as if in agony, like a snake that wishes to free itself from a firm hold.

PEERLESS MOUNT MIYETZIMU

High above the gorge to the west, and almost as if contiguous with the sheer black wall, rose the peerless peak of Mount Miyetzimu, some 24,000 feet into the azure sky (see page 177).

Miyetzimu is the most glorious peak my eyes were ever privileged to see; no wonder the Tibetans stand in awe and worship it. It is like a castle of a dream, an ice palace of a fairy tale, or an enormous mausoleum with gigantic steps and buttresses all crowned by a majestic dome of ice tapering into an ethereal spire merging into a pale-blue sky.

Next to it is a huge crest of ice resembling a giant cockscomb; then comes Kaakerpu (page 152), from which the range derives its name, a vast pyramid of ice with glaciers radiating in many directions. One of these descends from the finely ridged vertical peak into the valley of the Mekong, the river flowing some 15,000 feet below the summit.

Leaving the Mekong, we entered a narrow, rocky ravine to the right, at the end of which lay the frontier town of Atuntze, a conglomeration of flat-roofed huts.

IN A STREAM OF PILGRIMS BOUND FOR SACRED DOKERLA

I now decided to cross to the sacred Dokerla, to the south of Mount Miyetzimu, and photograph this glorious range from Tsarüng, in Tibet, following the trail trodden by 20,000 pilgrims every year.

The journey took eleven days.

To reach the Doker Pass, at an elevation of 15,000 feet, one must first cross the rope bridge at Yangtzà, and camp several days on the way.

We were in a stream of pilgrims and a host of Tibetan coolies carried our luggage.

Dokerla is on the actual border between Tibet and China (see page 175). On the Tibetan side the mountain is very steep, the trail descending in 118 zigzags to the bottom of the ravine.

A constant stream of pilgrims treads the narrow trail with the sacred prayer *Om Mani Padme Hum* ever on their lips, as they whirl prayer wheels in their right hands. Thus they acquire merit. Many commit suicide by throwing themselves down the Dokerla, for to die on that sacred spot means emancipation and deliverance from rebirth.

Some there are, especially nuns and monks, who do nothing all the year long but cross the Dokerla in penance. It seems that the Tibetans alone of all the religious people of the world heed St. Paul's admonition, "Pray without ceasing." Some go so far as to measure with their own bodies the whole distance up and down the rocky path across the pass, over ice and snow. They lie flat upon

the ground, then rise, and where their outstretched hands have touched they lie down again, thus consuming months to make the weary journey.

We started on our return journey to Likiang on November 30 by a different route, crossing the mighty Peimashan range, which separates the Mekong from the Yangtze.

This range is much less eroded than the Salwin-Mekong divide, which acts as a rain screen, precipitating the monsoon clouds. Long after the passes to the Salwin are closed and all the flowers have died, the gentians are still blooming on snowless Peimashan.

THE FINEST OF THE YANGTZE GORGES

By far the finest of all the gorges in Yünnan are those through which the Yangtze flows north of Likiang, as it slashes through the mighty snow range (see illustration, page 140).

In grandeur these gorges may be compared with that of the Brahmaputra before it leaves Tibet for the Assam plain.

From Shiku, where the Yangtze turns north, flowing parallel to itself, the waters are broad and placid, the current gentle, and near Yulo, where a ferry plies, one would never dream that only a few miles farther on the river becomes a mad torrent flowing through a terrifying gorge.

The Yangtze flows at 6,000 feet elevation where it enters the gorge, and as the peaks of the range which it pierces as with a giant's sword are more than 19,000 feet in height, the gorge is approximately 13,000 feet in depth.

In many places the river is only 20 yards in width and is one continuous series of cascades and rapids. The actual depth of the water must be enormous, for the vast placid stream is here compressed into a narrow ribbon of white foam.

The cliffs rise steeply on both sides, culminating in jagged crags and pinnacles, and above these tower the ice-crowned peaks of the Likiang snow range (p. 182).

We entered the gorge after having crossed the Chungtien River, which flows into the Yangtze. A narrow trail for mules with Tibetan saddles permits ingress to Loyü, a hamlet within the gorge.

From here on the path can be used only by porters and leads at times 2,500 feet above the river. On the right cliff, perched in a small hollow, is a Lissu village, accessible only with great difficulty, while on the left are three small hamlets, veritable castles on the rocky bluffs. Beyond Djipalo it is possible to go down to the river bank and watch the rapids.

For three days the journey lasts, until Taku is reached. Beyond Pentiwan, the third hamlet in the gorge, the trail is exceedingly dangerous, as rock slides occur continuously.

As the ferry at Taku was smashed by the Tibetan hordes in April, 1923, and the owner placed in jail for possessing such a convenience for travelers, we were forced to return to Yulo, where we found another ferry.

From Taku the Yangtze flows north, only to return again above Fungkou, by Lapo, where it flows in rocky gorges worked by Nashi gold-diggers, who sell their precious metal to jewelers in Likiang.

THE YANGTZE'S ONLY BRIDGE BUILT BY A ROMANTIC HERO

Mr. Eric Teichman, a British consular officer, who traveled far and wide in China and Tibet, states in one of his books that in the whole length of the Yangtze course not a single bridge spans the river. He overlooked the imposing structure at Tsilikiang, one and a half day's journey southeast of Likiang (see page 183). This bridge is the result of a romance which may be told here.

Once, not so very long ago, lived a man in Hoking, south of Likiang. He fell in love, as most men do, but in China such things are prearranged by parents shortly after birth, and the individual has little to say about the plans. But this man had an independent spirit and he eloped. When he arrived with his self-chosen bride at Tsilikiang, the ferryman, who had already learned of the escapade, for news travels fast in China, refused to take the couple across the river.

The prospective bridegroom then swore an oath, that should he ever be blessed with riches he would build a bridge across the Yangtze, and thus facilitate matters for others in a like predicament.

The gods were good to our hero and he in turn to others; hence the bridge.

THE LIFE OF THE MOON-JELLY

By William Crowder

Author of "Marvels of Mycetozoa," in the National Geographic Magazine

With Illustrations in Color from Paintings by the Author

MY FIRST significant insight into the history of the moon-jelly (Aurelia aurita) was due to chance. It was a late afternoon in October. At the thwart of my little boat I was studying with curious eye a varied population that covered the crumbling framework of an old and partly submerged wreck.

Mussels and barnacles had for the most part preëmpted the available areas of the rotting hulk; but here and there, exposed by the falling waters of the outgoing tide, were also to be seen the flaccid forms of seaweeds and hydroids, anemones and starfishes, and other less rigid shapes which made up the more colorful part of the living mantle that draped the dripping hull.

Eventually darkness came and the tide turned. A heavy mist arose. Out of the starless void the incoming waters flowed silently, swiftly, luminously—a ghostly stream, a river of sulphurous light!

For a while I remained intrigued by the eerie splendor of the night. I seemed to be sailing over a milky sea which throbbed with flames of phantom fire. Pale, pulsating patches of glaucous light swirled by, losing themselves in eddies of vaporous blue. Scintillating points of purple, coming close, would suddenly flare, then as suddenly fade.

Diffused flashes of an unearthly hue appeared on every side, and as they glided past — mysterious, vague, unreal — it seemed as if I were drifting through cosmic space, through a delectable realm of illusion.

A LIVING DRAPERY OF FLASHING COLORS

The mist then cleared away, and with its dissolving the skeletal outlines of the ancient hull above the water line loomed black and indistinct in the vastness of the night. Below the water line it was invested with a living drapery of ambient fire — of azure and of violet, fleeting flashes of mauve, and ripplings of pale ruby and rose.

Like embers fanned by a fitful breeze, the submerged timbers were tremulous with a warm and friendly light, made up of thousands of jellyfishes, none of which was larger than the breadth of my two hands.

Free and vigorous use of my dip-net was made, and soon the half-barrel at the bow of my boat contained a crowd of the creatures swimming to and fro, emitting violet flashes and filling the tub with a continual glare. I examined them in the strong beam of my electric flash lamp.

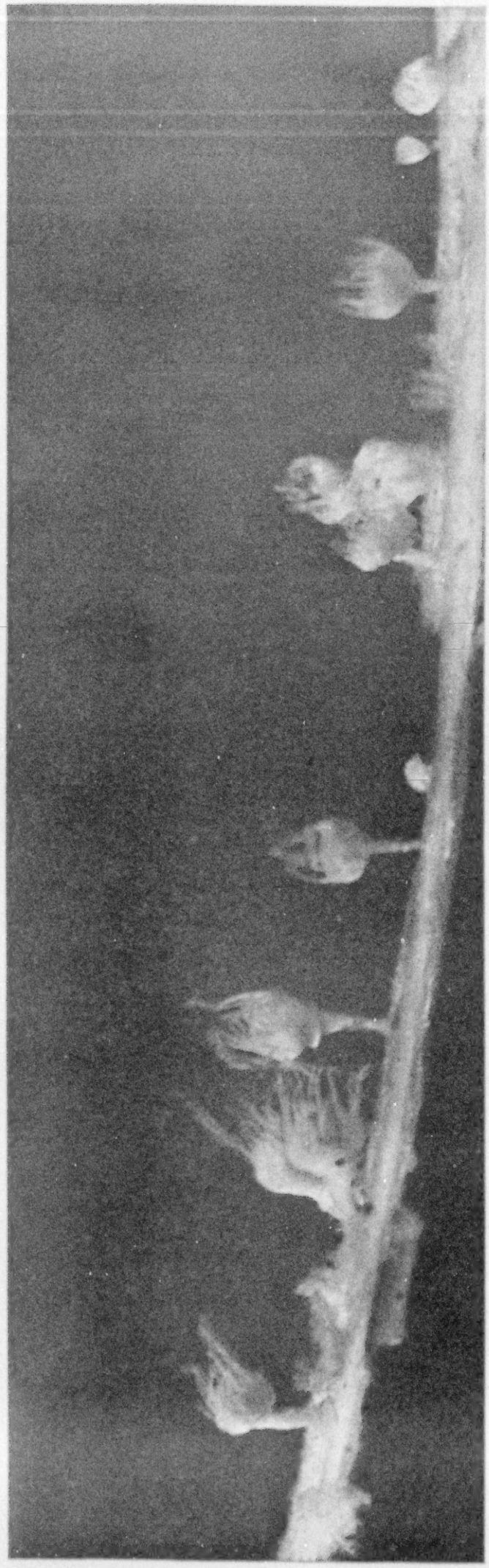
But how can I adequately describe the moon-jelly? Picture, if you can, a flattened, soft, jellylike hemisphere of about the diameter of an ordinary soup bowl (see Color Plate I). Indeed, for our purpose, the animal may well be likened to an inverted bowl of glass, for in this position it propels itself through the water.

Within the outer, exceedingly transparent dome is another one less arched, but equal to it in diameter, and joined to the other throughout the extent of its rim. This rim is notched at eight equidistant points, thus dividing the periphery into eight lobular structures, each bearing a fringe of numerous threadlike tentacles less than a half inch in length.

The inner dome is of a bluish milky white, marked with confluent veinlike patterns extending radially from the central region, which is distinguished by the most curiously shaped structures of any jellyfish—peculiar horseshoe-shaped gonads, or sex organs (see page 191).

They are four in number and are placed with their open ends facing the center. It is by these prominent organs that Aurelias are easily distinguished in the water from all other jellyfishes.

The individuals in my tub differed from each other in the color of these gonads. Some were of a pinkish cast (the males); others were a bright yellow, the latter being gravid females, whose pouches were laden with eggs, and a



Photograph from William Crowder

YOUNG JELLYFISHES, SOMEWHAT MAGNIFIED

Although the young jellyfishes seem to seek the deeper water to develop, they are often found in considerable numbers attached to seaweed and other vegetation near shore. Two stages of the young are here shown fixed to a spear of eelgrass. To the right are the *scyphistomæ*, and to the left are the *strobila* forms (see text, pages 192 and 201).

magnifying glass showed that the folds of the veil-like appendages around the central mouth were clotted with countless minute larvæ, or planulæ, only slightly advanced from the egg stage.

THE JELLYFISH SWIMS WITH ITS "UMBRELLA"

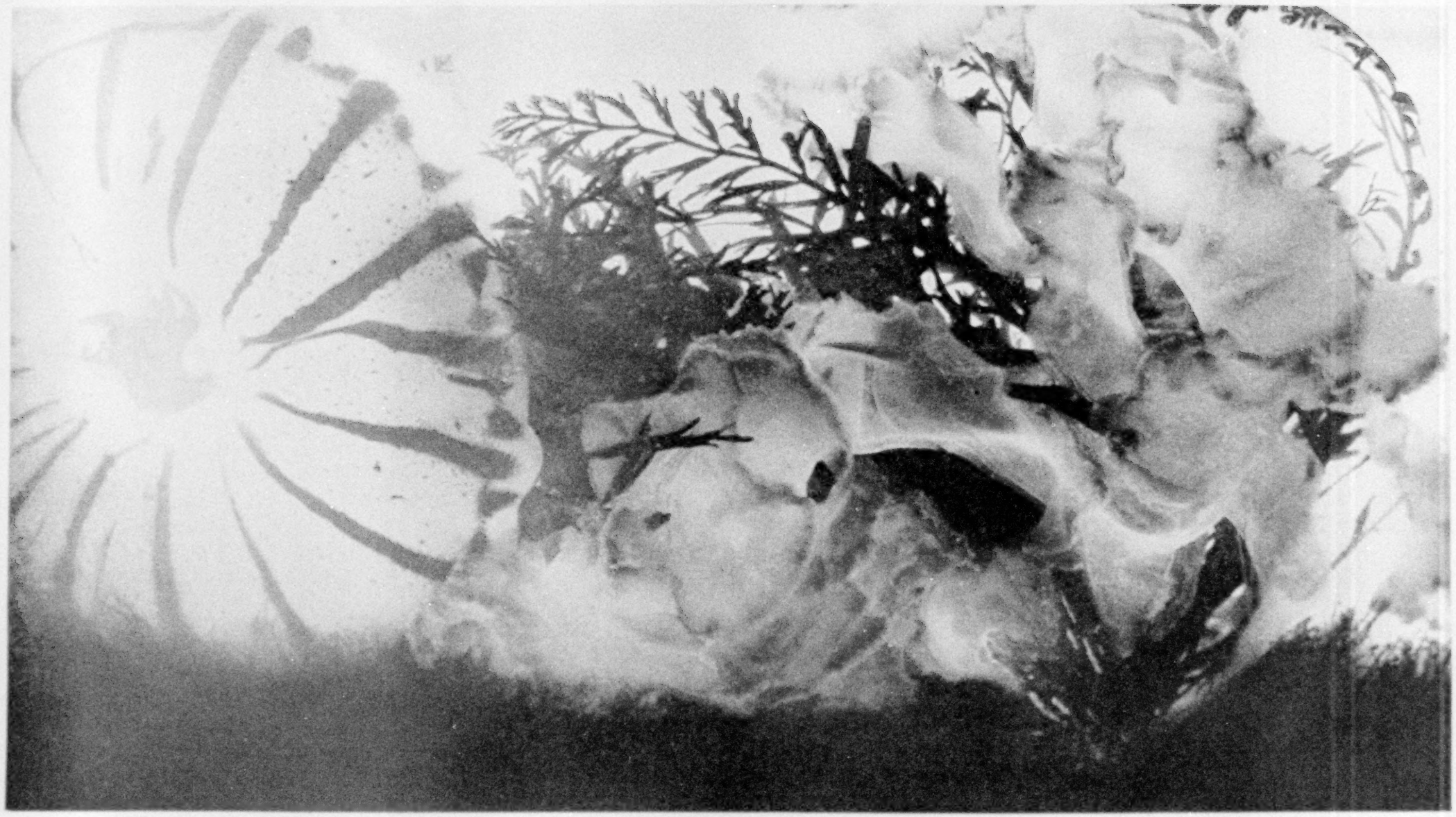
Naturalists call the bowl-like part of the jellyfish's body the "umbrella," which is both the swimming apparatus and the covering for the so-called stomach and other organs. The likeness is even further carried out when the creature as a whole is considered; for suspended from the central part of a membrane drawn across the under side are the mouth-parts, consisting of folds of four loosely dangling veils, much in the position of the handle and shaft of an umbrella.

And just in the manner that an umbrella is alternately opened and closed, so does the moon-jelly manage to swim. Perpetually pulsating, it sustains itself at various depths or travels hither and yon at will.

It became evident, however, that Aurelia was not the only light-producer among the inmates of my tub. In fewer numbers, but with a luminosity equal to that of the moon-jelly in its intensity, was a smaller form, the comb-jelly. No bubble blown can be more splendidly iridescent. Diaphanous, transparent almost as the water in which it swims, and seemingly with the merest trace of substance to its delicate body, it reflects the luster of a hundred evanescent hues.

HAIRLIKE OARS DISTINGUISH THE "COMB-BEARERS"

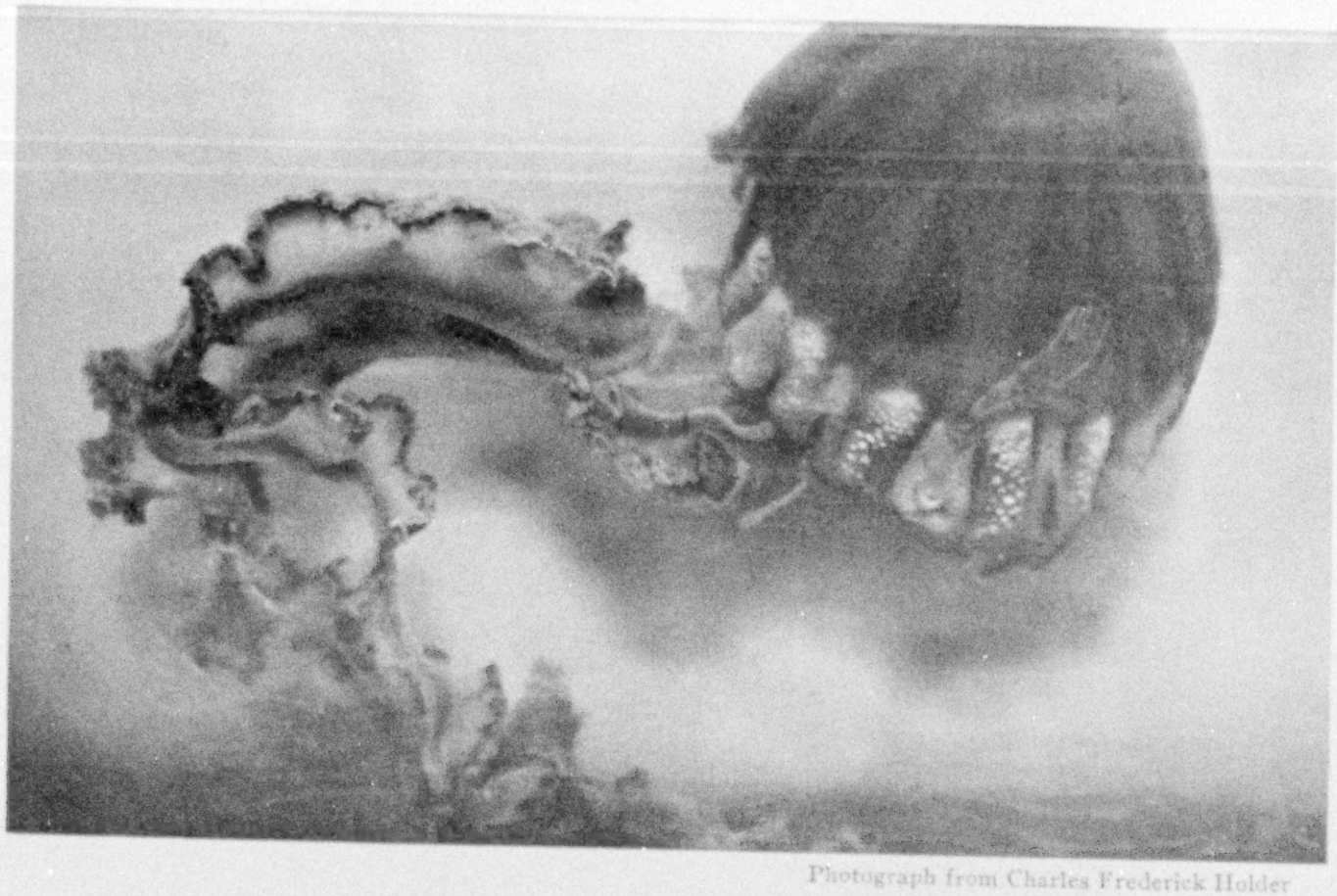
The individuals I had captured were graced with the



Photograph from Charles Frederick Holder

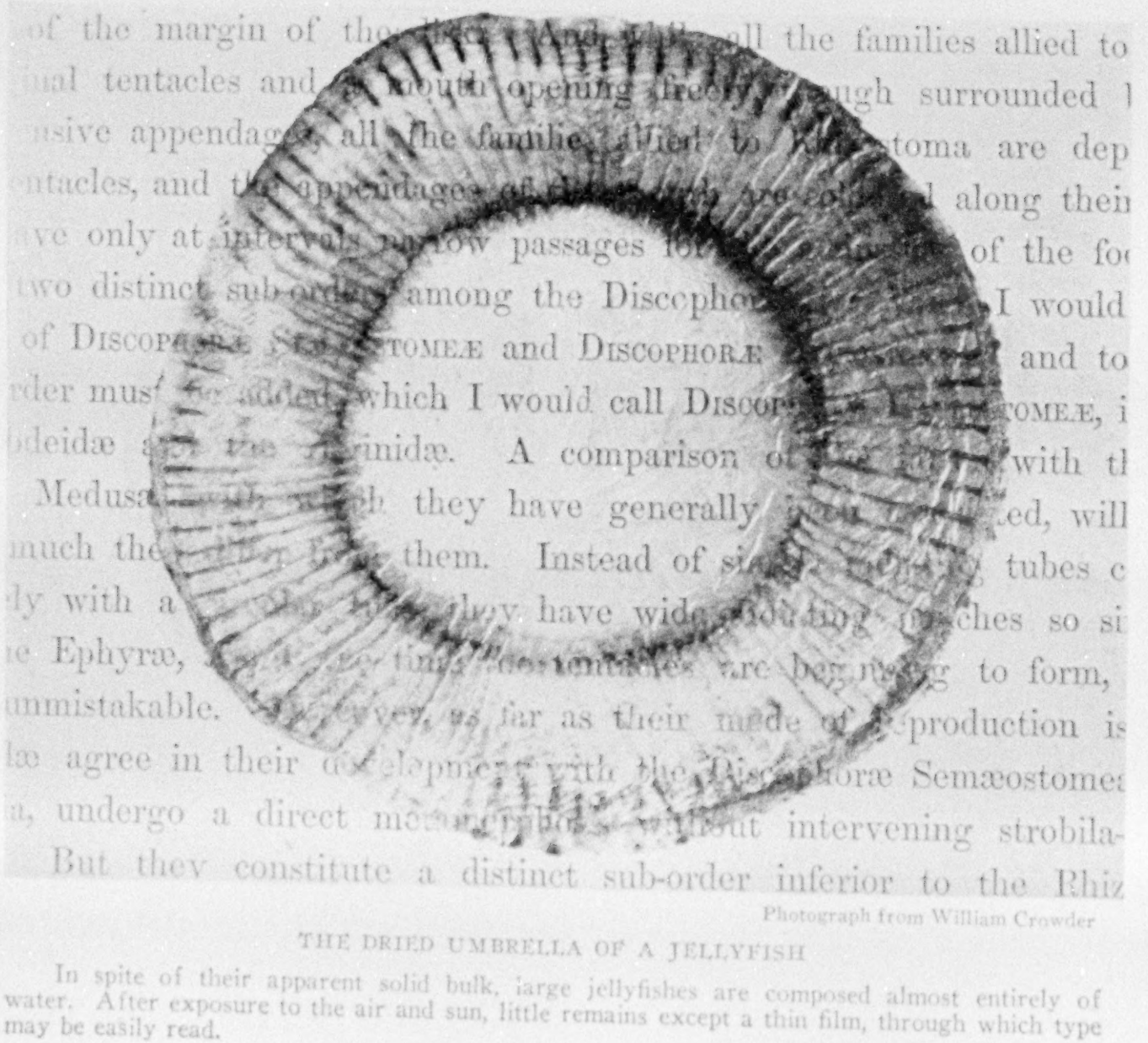
A GIANT JELLYFISH

Some of these marine creatures have tentacles many feet in length. Jellyfishes are best known to salt-water bathers as "sea-nettles." They sting their victims by means of a tiny mechanism attached to the tentacles and consisting of a sac containing an irritant poison. Within this is coiled a slender, threadlike tube, sometimes barbed. A microscopic "trigger" hair projects from the outer surface of the sac, and when touched discharges the tube, which has a considerable power of penetration. The result is much as if the poison had been injected into the body with a miniature hypodermic and produces a burning sensation on the skin.



Photograph from Charles Frederick Holder

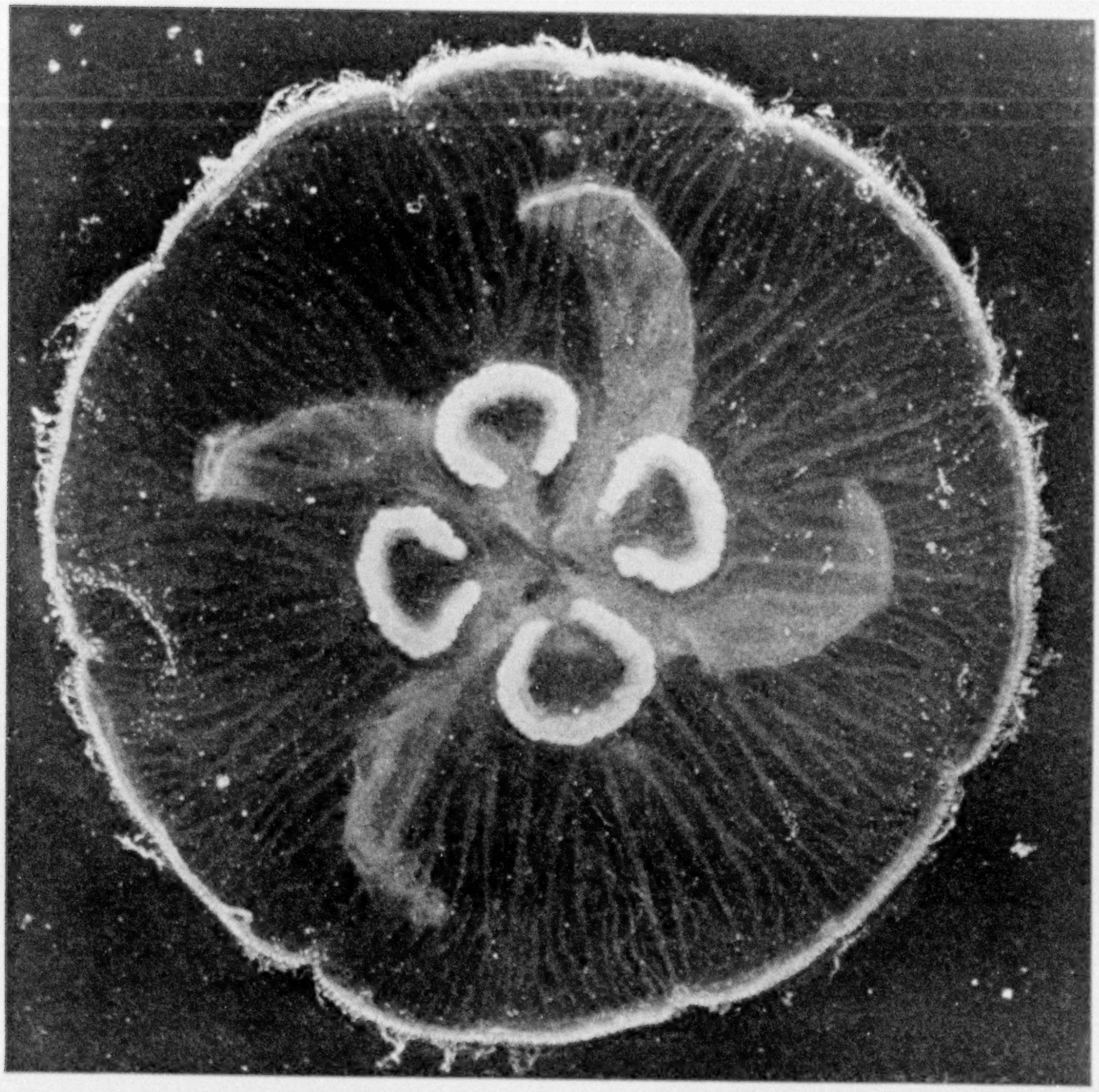
A BLACK JELLYFISH PHOTOGRAPHED UNDER WATER



Photograph from William Crowder

THE DRIED UMBRELLA OF A JELLYFISH

In spite of their apparent solid bulk, large jellyfishes are composed almost entirely of water. After exposure to the air and sun, little remains except a thin film, through which type may be easily read.



Photograph from William Crowder

THE MOON-JELLY, ONE OF THE COMMONEST, AS WELL AS ONE OF THE PRETTIEST, FORMS OF JELLYFISHES OF THE ATLANTIC SEABOARD

The conspicuous horseshoe-shaped structures in the center are the sex organs (see text, page 187).

generic name of Mnemiopsis (see Color Plate V). Their more colorful areas were restricted to the eight rows of cilia, or hairlike processes, extending along the longitudinal axis of their pear-shaped bodies.

It was with the aid of the cilia that they swam, a performance entirely unlike that of their larger companions, the moon-jellies. The hairs were tiny oars, lashing in unison and vibrating so rapidly that the eye could not catch their motion. As a consequence, the cilia seemed to be held stationary at various angles to the body, thus forming a resemblance to a comb.

One morning, within a week of the transfer of the moon-jellyfishes to the tanks of my laboratory, which is less than a hundred paces from the shore, I discovered that the water seemed to be foul. Apparently the change had taken place overnight, for on the preceding day the tanks were clear and the jellyfishes were pumping their way rhythmically and vigorously around their watery cells.

The suspicious appearance of the tanks was further heightened by the fact that in nearly every instance the moon-jellies were lethargic or were lying seemingly dead on the bottom.

Gradually the cloudiness of the water lessened and began to localize, condensing

into a filmy haze on the side of the tanks facing window light.

Now, something like this I had seen once before—when fiddler-crab larvæ had left the egg-mass of the mother and had swarmed in myriads toward the light. Could it be that this was an exodus of the same kind?

YOUNG JELLYFISH HOVER TOWARD THE LIGHT

I examined the jellyfishes, which evidently were making their last attempts at locomotion. Suddenly the secret was revealed—the brood-pouches were bare and the oral appendages were as clear as glass. In brief, the cloudlike haze was composed of the multitudinous young of Aurelias.

Under a low-power lens the lively little creatures appeared as long and nearly as broad as my finger nail. They were pear-like in shape and quite transparent. Here and there they swam across the field of view in graceful curves, with their larger, or bulbous, ends foremost.

So swiftly did they move that it was difficult to follow them. Only when their action was retarded by some artificial device was one enabled to see the means wherewith these actually all-but-invisible motes propel themselves. The rapidly vibrating, hairlike cilia—short, tenuous, innumerable—were driving the planulæ forward.

For several hours the young creatures continued to hover on that side of the tanks receiving the strongest light. They seemed not to assimilate any food, nor did there appear to be any physical provision for this purpose; yet they not only lived actively, but they seemed actually to increase somewhat in size.

THE MOON-JELLIES DEVELOP MOUTHS

For further observation, I transferred the water of the tanks into various smaller receptacles—tumblers, sauce dishes, and cups. Moreover, it became obvious that the adult jellyfishes would not survive, and their death, with the consequent danger in their disintegration, threatened grief to the smaller fry and to my investigations.

Barely were these preparations made when the larval hordes ceased swimming and congregated on the bottoms and sides of their respective quarters. A decided change in their appearance was now taking place. Most of them had so altered as to look very like a chalice in form; but even more significant was the fact that the altered individuals had attached themselves to the floors and walls of their artificial homes by secreting a hard substance at the end of the supporting stem.

Excitedly I watched the living goblets, and even as I looked further changes slowly took place. Around the rims of the cuplike bodies prominences began to appear. Finally each larva was adorned with a set of eight tiny threadlike tentacles, which more than doubled the total length of the individual.

In the center of the area lying within the base of the tentacles was a slight protuberance punctured with a crisscross cut leading to the interior of the larval belly. An unmistakable mouth had come into evidence.

STINGING CELLS PARALYZE PREY

This early, fixed, or sessile form of Aurelia is called the *scyphistoma*. It is a way that science has of telling us that the animal in general and the mouth parts in particular are distinguished by being cup-like (see page 188).

In the succeeding days the feeding of my strange family threatened to become a problem. The difficulty was not that I was unaware of what they would eat, but that the manner of supplying them was a labor or at least a troublesome routine. There was no mistaking the function of those murderous arms: tiny tentacled creatures such as these subsist almost entirely on still smaller animals that lucklessly swim into their grasp, or, lacking this living fare, they seize upon any bit of carrion drifting by.

This extraordinary capacity of the tentacles wherewith they are enabled actually to paralyze their prey, is due to the hundreds of stinging cells that invest these organs.

Under the microscope the cells appear egg-shaped, and each contains a thread-like filament coiled within like a spiral spring. One end of this spring is attached to the cell; the other end is free and is charged with a highly irritant poison.

When any organic matter, dead or living, comes into contact with the tentacles,

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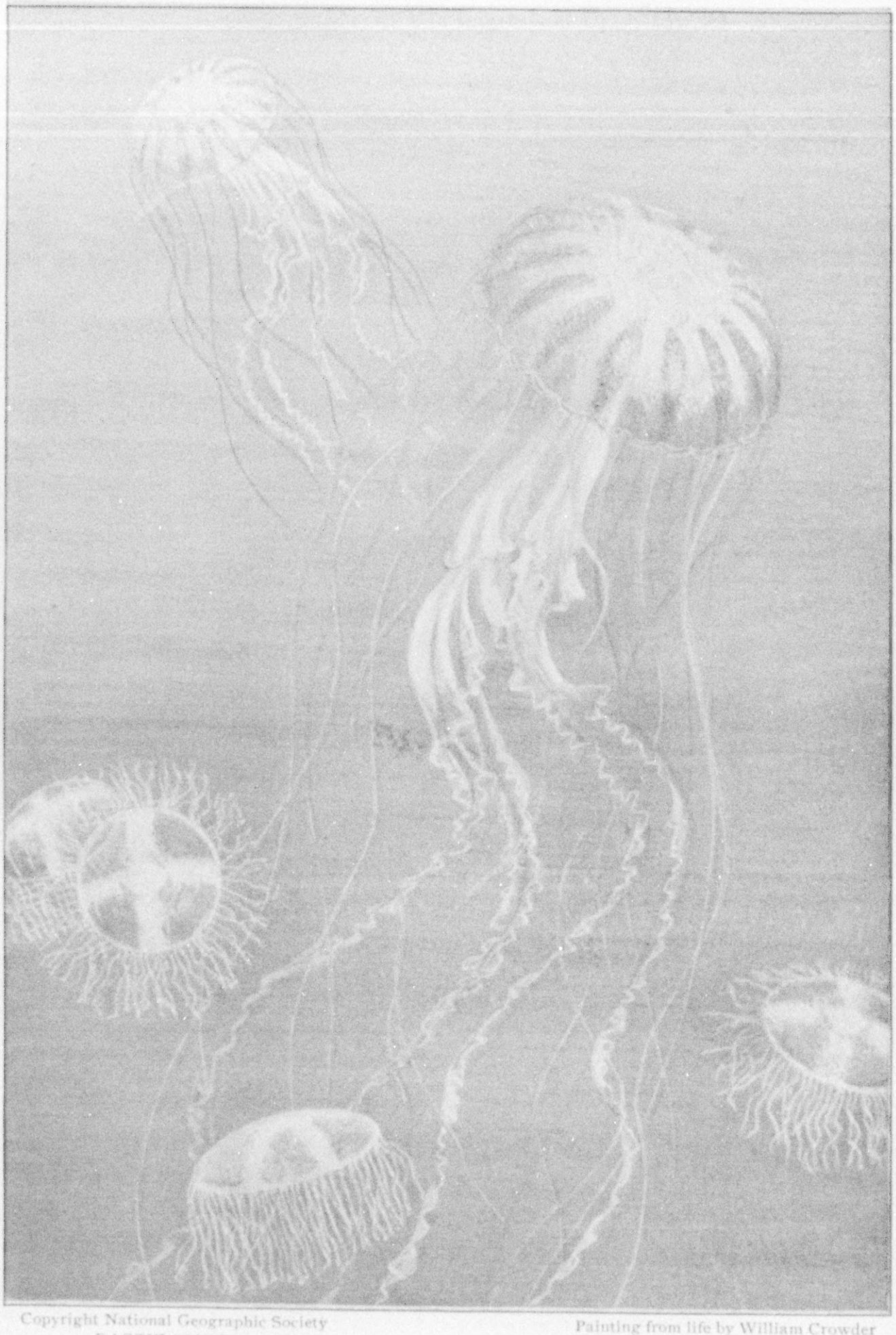
AURELIA AURITA, VARIETY FLAVIDULA (THE MOON-JELLY)

This jellyfish is common from Nova Scotia and the New England shores southward, and is perhaps the most familiar to our seashore visitors. Yet its strange beauty always awakens wonderment. Its curious life history is given in the accompanying article (see text pages 187 to 202).



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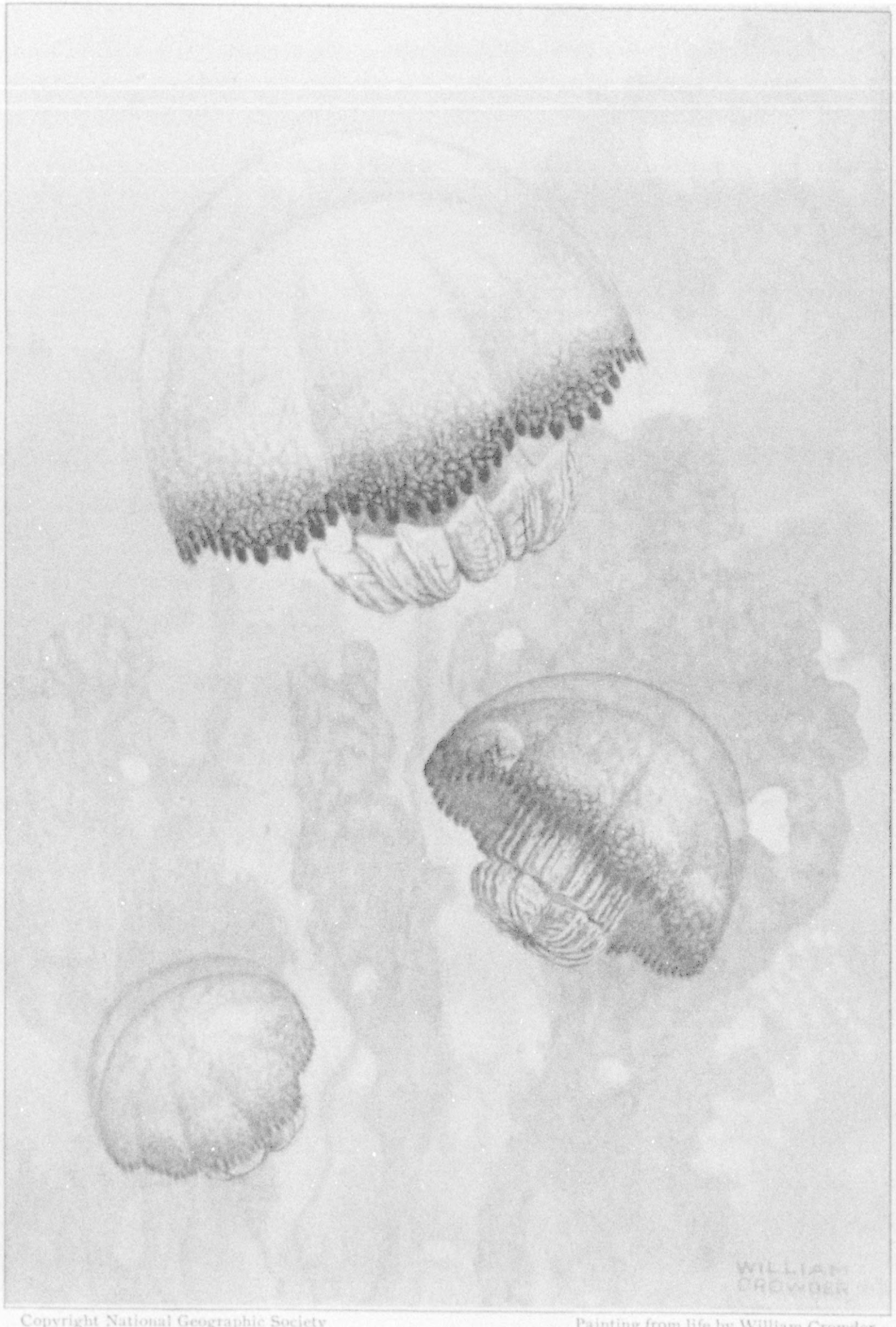
DACTYLOMETRA QUINQUECIRRA (Upper); GONIONEMUS MURBACHII (Lower)

The two large forms at the top of the picture are known as the speckled-jelly and have a particularly irritant poison. They are Scyphomedusæ and, like the Aurelia, start life as individual units. The smaller jellyfishes at the bottom, however, pass through a colony stage, resembling a many-flowered plant, each "flower" being a young jellyfish. These plantlike structures are known as Hydroids.



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STOMOLOPHUS MELEAGRIS, A ROOT-MOUTH JELLY

Stomolophus may be seen frequently on clear, sunny days. It is, however, very sensitive to weather conditions. At the first impending cloud shadow or the least agitation of the water by the wind, this jellyfish will sink into the depths to remain until all is again serene.

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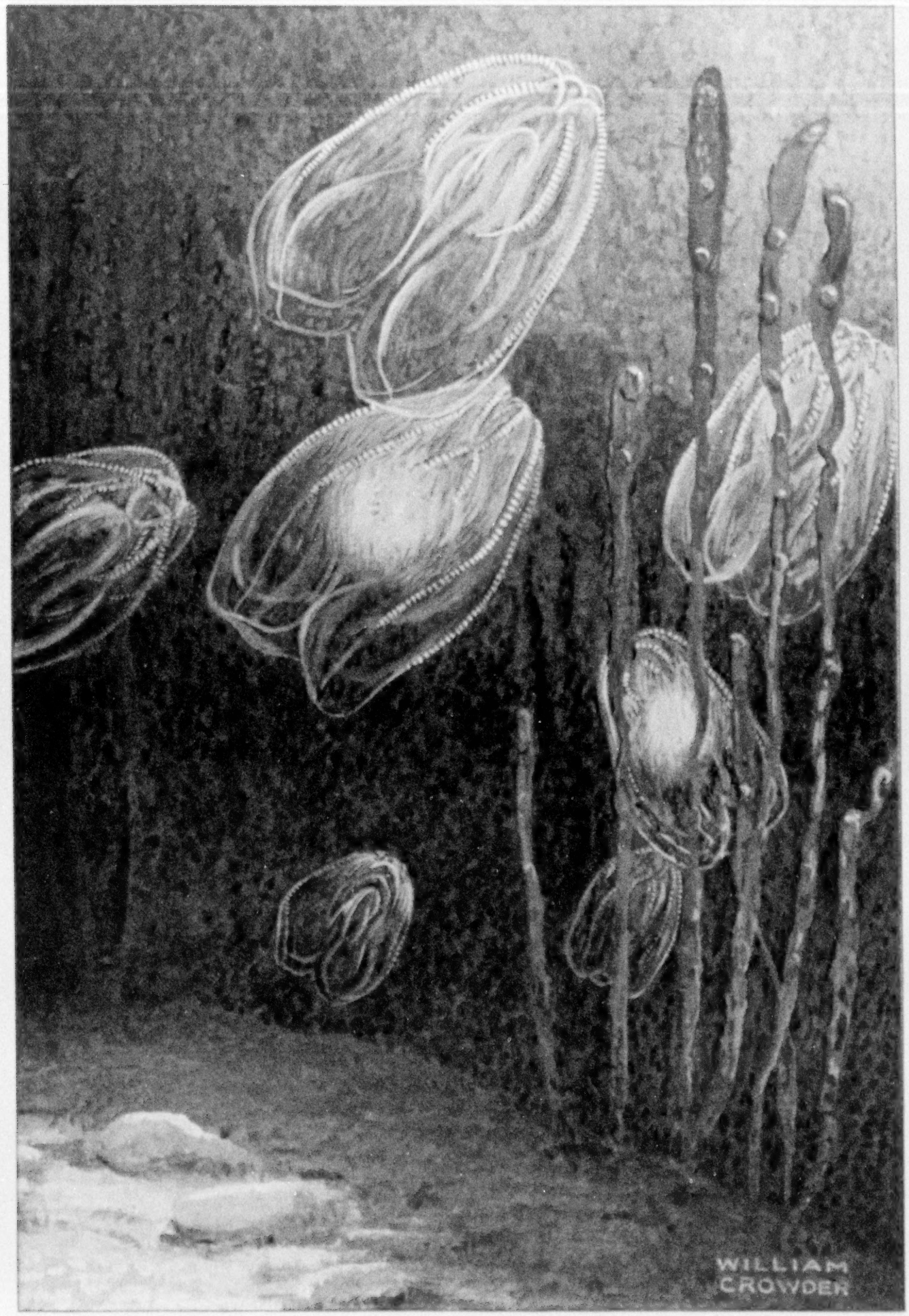
CYANEA CAPILLATA (*Top*); PELAGIA CYANELLA (Middle Left); LINERGES MERCURIUS (Lower Right)

Jellyfishes range in size from microscopic dimensions to several feet across the "umbrella," or disk. Cyanea, or the sun-jelly, is perhaps the largest of all; individuals have been captured measuring seven feet in diameter and with tentacles 120 feet long. It is found along the North Atlantic coast, from Boston to the Arctic. At the lower right are thimble-fish.



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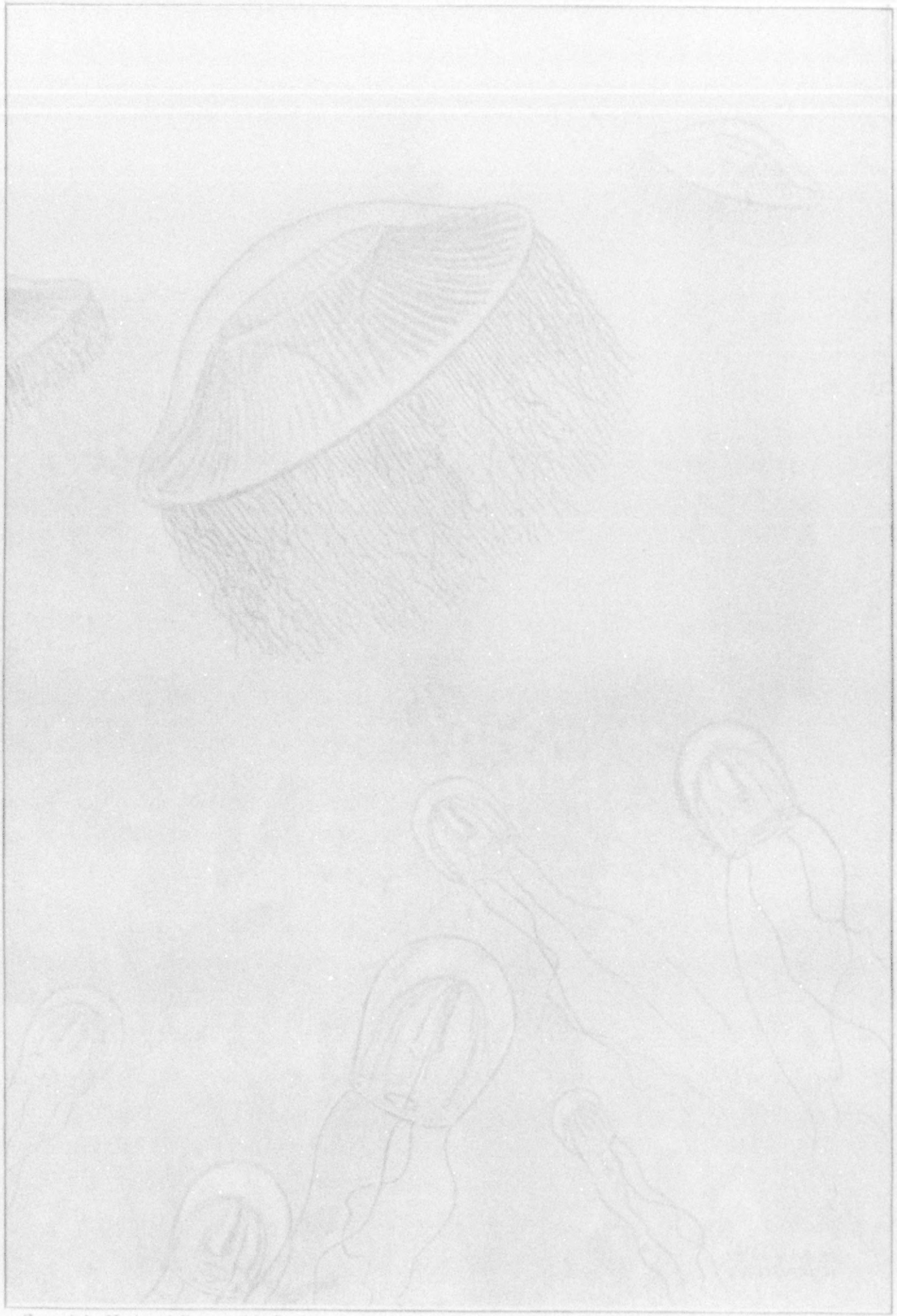
MNEMIOPSIS LEIDYI (THE RAINBOW-JELLY)

The comb-jellies are so called because the fringe of hairlike structures with which they swim resembles a comb. All of them are probably phosphorescent and in the vicinity of a passing rowboat their presence after dark gives rise to a spectacle of singular beauty.



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ZYGODACTYLA GROENLANDICA (Upper); SARSIA MIRABILIS (Lower)

The extreme tenuousness of many jellyfishes, with respect to their comparatively large size, is one of the marvels of Nature. So delicate in structure are some forms that a touch of the finger is often sufficient to rupture the tissues. Yet they capture and kill for food small crustaceans and fishes much more robustly organized than they. The life histories of the jellyfishes are among the most peculiar of the whole animal kingdom.

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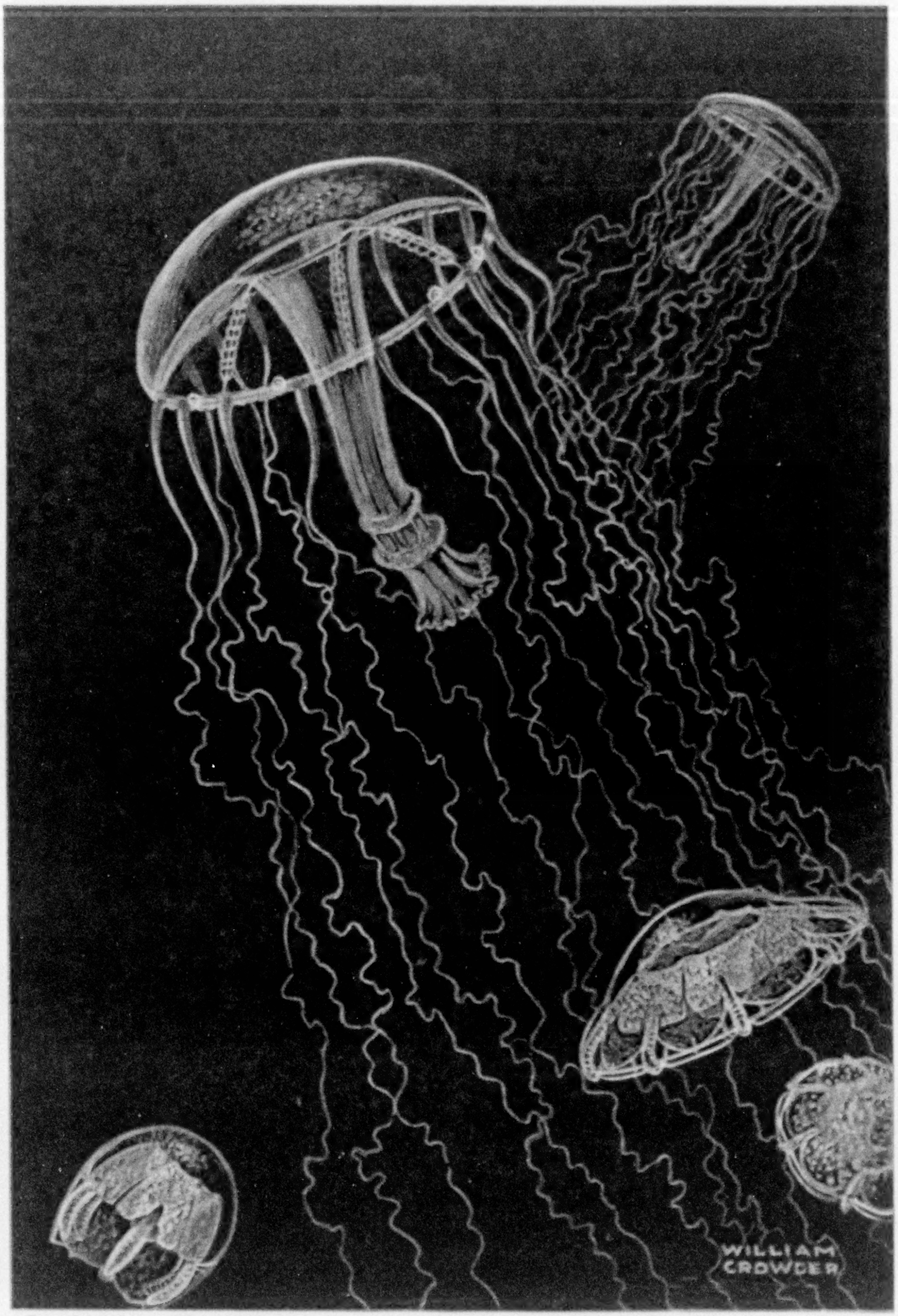
PLEUROBRACHIA RHODODACTYLA (Upper); BEROE CUCUMIS (Lower)

Both of these species are comb-jellies and are related to the rainbow-jelly shown in color plate V. By reason of the highly iridescent surface of their membranous covering, the comb-jellies are all beautiful. But the two species here shown are exceptionally charming; the upper, by reason of its graceful outlines, and the lower, because of its delicate rose-tinted structure.



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EUTIMA VARIABILIS (Upper); CUNOCTANTHA OCTONARIA (Lower)

While some individuals of all species of jellyfishes are occasionally found near the shore, there are a few forms that seem habitually to frequent the outer reaches or the depths. Eutima and Cunoctantha are depth haunters. In those silent solitudes, where the last feeble rays of sunlight cannot penetrate and beautify with an iridescent luster their transparent bodies, these jellyfishes roam about combing and searching the water for food.

the cells in the vicinity release the coiled darts, and these are driven into the object, numbing or arresting it. Thereupon the morsel is brought to the mouth and devoured.

My young moon-jellies were fed two or three times a week on a small measure of a kind of salt-water broth composed of finely divided clam or crab meat or fish, which was stirred into the tanks.

After a few hours, during which the moon-jellies had their fill of the drifting particles, the water was removed and then replenished, fresh from the sea.

EACH JELLYFISH DIVIDES INTO SEVERAL INDIVIDUALS

Winter was well on its way before the scyphistomæ showed signs of a further change. The countless billions of their brethren who found a foothold on the floor of the sea were now probably passing a dormant life in the cold and gloom prevailing in the depths, where there was a scarcity of food. But in the genial temperature of my laboratory the case was otherwise.

The scyphistomæ were increasing in size and had attained to a height of nearly a quarter of an inch. The tentacles seemed to have shrunk to insignificant proportions, but the outstanding feature was the dozen or more constrictions that encircled their bodies.

In every instance the topmost constriction was so deep that it seemed almost to sever the terminal part carrying the mouth and tentacles. This segmenting of the young jellyfish is technically known as the "strobilization of the scyphistoma."

A few days later the tentacles at the top disappeared. In their place there was a corolla of eight lappets. The mouth-parts became four veil-like appendages, which, in lieu of the vanished tentacles, captured the creature's food.

But what an astounding change had taken place in the other part of the diminutive body! The constrictions were now so pronounced that the animal would seem almost to be completely divided into thin segments resembling a pile of tiny saucers, each nestling snugly in the hollow of the one underneath.

In descending order from the top, the segments were obviously at different stages of development: each was of a smaller diameter than its neighbor above and resembled less and less the topmost and first-formed disk until the foot was reached. The lowermost supporting segment was the only one still bearing its quota of tentacles.

Here we had the *strobila* form of Aurelia. And it was easy to see that what we now had to consider was no longer an individual organism, but a string of little jellyfishes, each individual inverted from the normal adult position and each attached to its fellow by the central part of the umbrella (see page 188).

Events now succeeded each other rapidly. The topmost unit of every column, an *ephyrula,* was seized with an occasional paroxysm and it suddenly started pulsating, after the fashion of the adult, as if to tear itself from its anchorage.

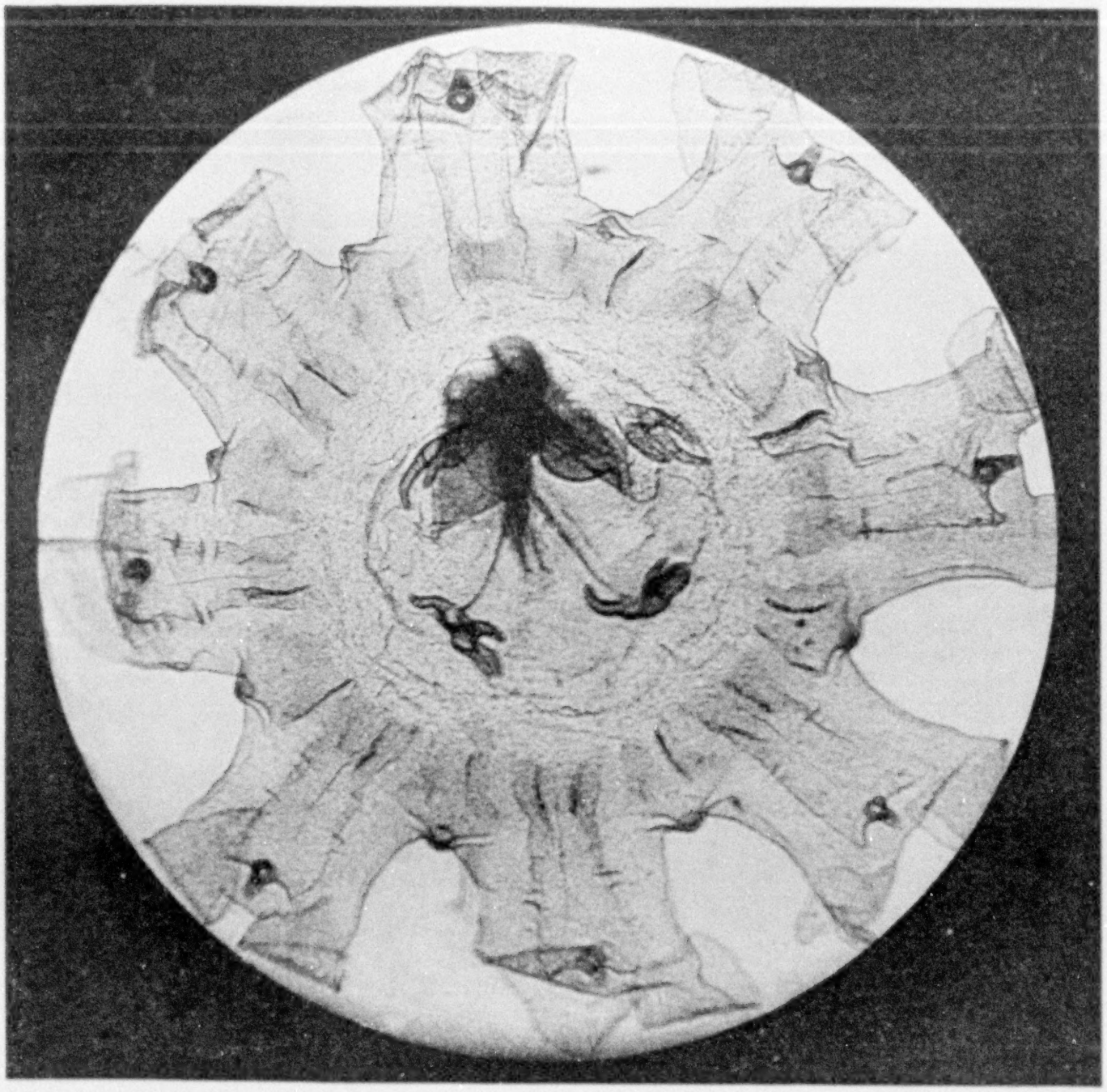
Apparently its efforts were to no avail, for the contractions eventually ceased as abruptly as they began. However, the periods of quiescence became fewer and shorter. Finally, the ephyrula settled into a steady pumping of its disk. Then at last it broke away, swimming upright, in the manner of its elders.

Thenceforward throughout its life the rhythmic movement of the umbrella continues without interruption, like the ceaseless beating of the human heart.

In less than a fortnight my long observations were at an end. The strobilæ were no more. The ephyrulæ that were formed later had followed their first-freed fellows and were coursing here and there, doubtless trying to find that liberty of the open waters which even the generous limits of my largest tanks did not afford.

THE LOWLIEST CREATURE THAT HAS AN EYE

A close-up of the little ephyrulæ reveals some noteworthy points. Each baby jellyfish is provided with eight primitive eyes, located around the rim of the umbrella, within the forks of the fingerlike lappets that took the place of the tentacles. They are visible as minute scarlet dots. A small transparent hood covers each eye; from this pouched structure, the members of the class to which our Aurelia belongs are often referred to as the "covered-eye medusæ."



Photograph from William Crowder

EPHYRULA OF THE MOON-JELLY, GREATLY MAGNIFIED

The young jellyfish, when starting out on its free-swimming life, is very minute, its diameter being less than that of the head of a pin. It has eight so-called eye-spots, or rudimentary eyes, seen in the photomicrograph as dark bodies on the lappetlike edge near the margin of the circle.

This is the lowest animal in the living scale wherein the eye appears as a structural organ; but it is quite certain that the jellyfish cannot see in the way that human beings do. It is probable that such a lowly eye can distinguish nothing more definite than light and darkness, or at best, moving masses.

Not long after, a new set of tentacles made its appearance. Between the lappets and around the underside of the umbrella rim extends a veritable fringe of these paralyzing organs, which resemble short gossamer strands whose delicate sheen is like some subtle reflection, now of silver, now of gold.

Most Aurelias are short-lived, probably never completing the year in which they are liberated from the larval form. In fact, the greater number of these delicate creatures do not survive the autumnal storms, which tear asunder their gelatinous bodies and dash them upon the shores, where they disintegrate. But this unseemly end is not without its compensation, for thus are released countless numbers of unborn young to begin the cycle anew.

Such is the story of one of the commonest creatures that swim the temperate seas, a creature which takes rank as one of the ocean's loveliest ornaments.

STRUGGLING POLAND

A Journey in Search of the Picturesque Through the Most Populous of the New States of Europe

By Maynard Owen Williams

Author of "Czechoslovakia, Keyland of Central Europe," "At the Tomb of Tutankhamen," "Latvia, Land of the Letts," "Russia's Orphan Races," "The Grand Duchy of Luxemburg," "Through the Heart of Hindustan," etc., etc., in the National Geographic Magazine

With Illustrations from Photographs by the Author

A PICTURE of day-by-day life in Poland, without regard to its seething political undertone, was the object of my stay of several months in this reincarnated republic, the most populous of the new states created as an aftermath of the World War.*

In a search for the picturesque, I traveled to all quarters of the republic, which accounts itself the sixth largest state in Europe, embracing an area of nearly 150,000 square miles.

The porter who meets one at the train in Warsaw was but yesterday a millionaire. Fantastic figures gave birth to fantastic habits. No one asked for change. With a mass of brain-cluttering zeros, it was easier to deal in round numbers. Then came the zloty, worth a gold franc, twenty cents, or 1,800,000 Polish marks.

There were no zeros to toss around and many travelers, likewise reduced from the ranks of millionaires, prefer to carry their own bags; hence there are three porters for every job. Each must live from the proceeds of a day, two-thirds of which is taken up in having his services refused.

As a droshky rolls up the blue-coated driver in a leather cap hands his number to a policeman, who slips it onto one end of a broken ring. A duplicate number hangs between the shoulder-blades of the cabby. When an arriving passenger wants a carriage, a number is slipped off the other end and the driver of that number wins the fare, according to the first-come-first-to-serve principle.

Occasionally, when demand for droshkies exceeds supply, a number never gets onto the ring, and instead of a lot of tags representing idle carriages there is a queue of potential patrons.

At the hotel a long succession of military heels, relief committee boots, and suitcase salesmen's shoes have reduced to paper thinness the carpets in which one once waded through luxury. Exasperated guests have killed flies against the wall paper. Careless bacchantes cooling their brows have broken the bottoms out of the washbasins. After years of war and depreciation, funds must be found to restore the hotel to its former state. On top of the necessarily high price the municipality imposes an 80 per cent surtax, plus a dollar for a passport inspection each time one returns to town.

Beautiful parks and gardens surrounded by dull, gray, depressing streets are the first impressions which Warsaw, the capital city, makes upon the visitor.

Warsaw's Architecture Is Dull and Ponderous

The buildings are huge, impressive because of their size but not picturesque. One can imagine the way one of the big office buildings, for instance, was ordered:

"I want four caryatid figures, 800 feet of pilasters, eight balconies—make 'em heavy, understand—six dozen assorted whorls and sunbursts, and five tons of cement gingerbread. What's that? Windows? Oh, yes; you might put in a few of those, too."

Coupled with heaviness of construction, there is a somberness whose psychological effect is disheartening. There is nothing depressing about a country scene, even on a night without a moon; but in a city, with the sky shut out, darkness weighs upon the heart.

* See, also, "Partitioned Poland," by William Joseph Showalter, in the National Geographic Magazine for January, 1915.

THE PALACE SQUARE IN WARSAW

The monument was erected in 1644 by Wladislaus IV to his father, Sigismund III. There was a legend that when Sigismund lowered his sword Poland would be free, and when the retreating Russians, during the World War, blew up the main bridge of Warsaw the sword is said to have dropped from its former position. The Tritons at the base of the fountain were added more than two centuries after the 66-foot column was erected. The old houses across the square are of warm tones and picturesque lines.

The lack of lights cannot be due to ignorance, for the Warsaw Wanamaker knows his craft and has one feature of window decorating which seems excellent. Realizing that the portion of the window space nearest the glass lacks perspective, he cuts the front of the floor away, thus admitting light to the basement and increasing his floor space by half.

Everywhere merchants complained of poor business, yet the dullest of operettas was playing to packed houses at three dollars a seat because people were starving for brightness. It is true that those who formerly bought choice things are now poor, but bright lights also appeal to the *nouveaux riches,* even more than to those who have learned the value of soft illumination.

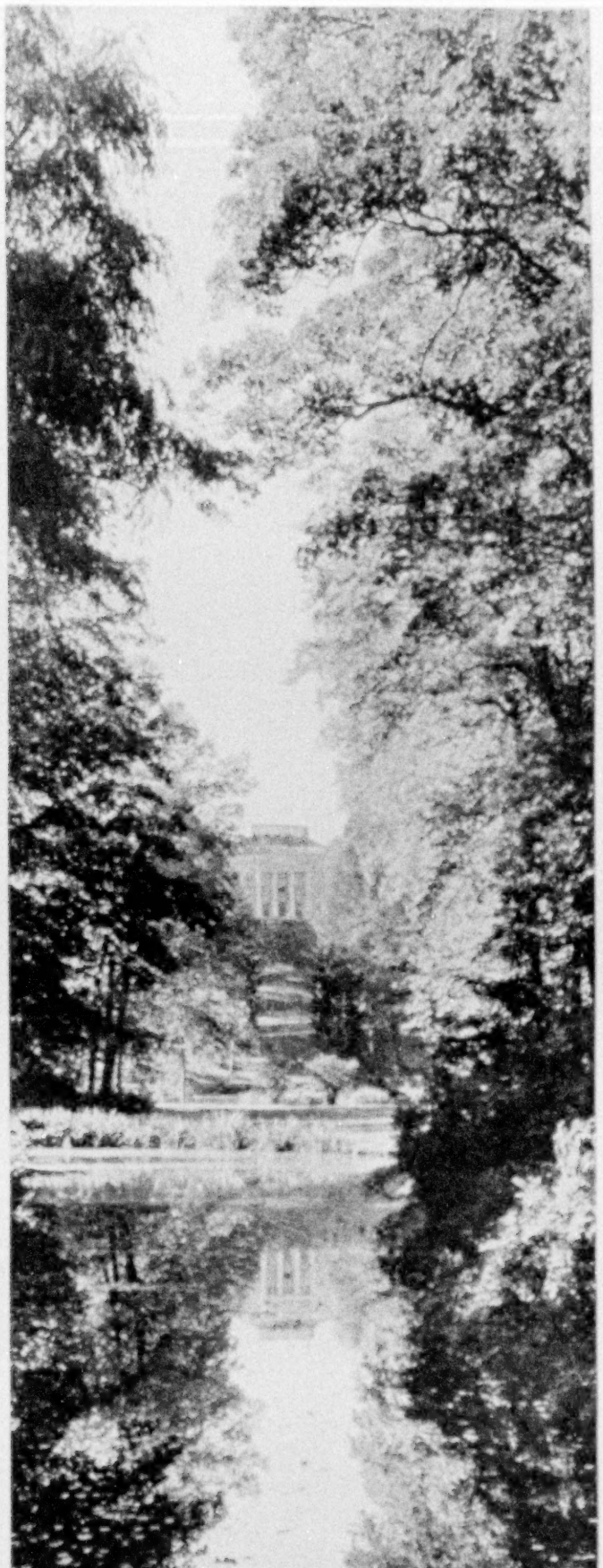
YOUNG WARSAW PARADES IN FUNEREAL SHADOW

From 6 to 8 every evening young Warsaw parades the thoroughfares between Theater Square and the Saxon Garden. Polish men are supposedly vivacious. Polish women are reputed beautiful. For want of adequate lighting, what might be a brilliant concourse is a funereal gathering wading through such darkness as would ruin Times Square in a single month.

The Poles are said to be the greatest dancers in the world, but the traveler seeking something peculiarly Polish in a public place finds an oily-haired banjoist pursuing a couple about the polished floor, a Negro trap drummer tossing his sticks in the air or coaxing a peculiar rattle from his drums with a wire fly-swatter, two pianists changing places and beating a tattoo with their hands preparatory to slamming the covers smartly in time to the music, and a saxophonist pausing in his mouthings long enough to wail, "Ma, he's keesing me!"

The Polish capital has many churches, massive and ornate, baroque outside and rococo within, full of memorials to those Polish exiles who did their work on foreign soil and to whom, under Russian rule, no public monuments could be raised.

In the Church of the Holy Ghost, in accordance with the great composer's wish, the heart of Frédéric Chopin is buried. Business men enter with brief cases under their arms and sit or kneel



THE BELVEDERE PALACE, POLAND'S WHITE HOUSE

This view is from a bridge in Lazienki Park and reminds one of the view of America's White House from the Ellipse.

A CORNER OF THE FRUIT MARKET OUTSIDE THE COVERED PUBLIC MARKETS, OR HALE TARGOWE: WARSAW

This center of petty trade is far more interesting than many of the palaces that have become private dwellings and are hence closed to view.

beside peasant women with milk cans or vegetables protruding from their shawls.

Chic Polish women slide out past some stooping peasant in top boots. On the broad front steps, old men and women in rags, a mother with a baby at her breast, await the alms inspired by brief communion with oneself or God.

In one of the busiest parts of the capital is a figure of the Savior, before which men remove their hats. Even the motorman, in passing, raises his hand from his control levers to make the sign of the cross.

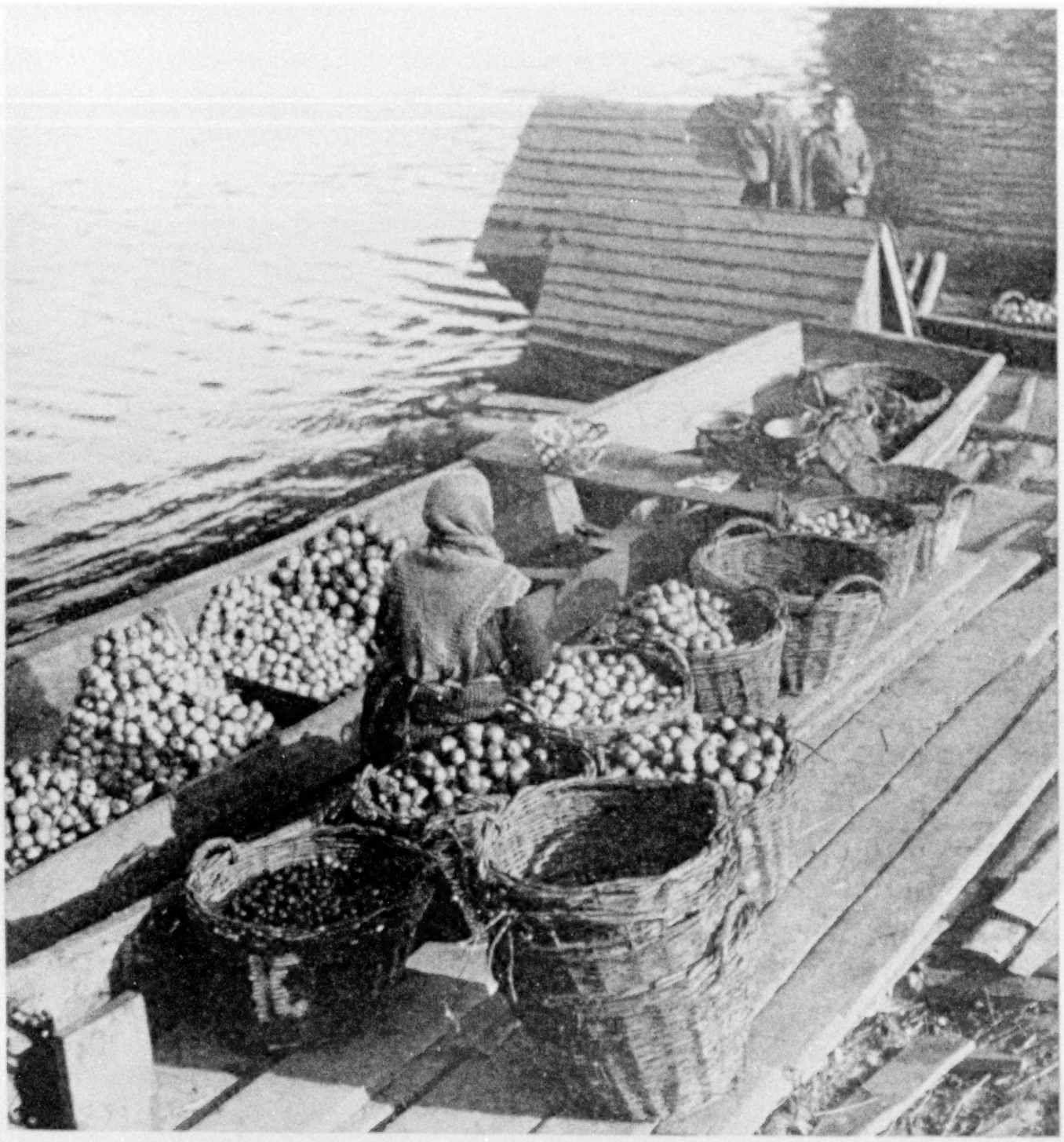
THE HORSE STILL RULES WARSAW'S STREETS

Modern though Warsaw is, it is still a city of horses. The finest sight in the streets is that of splendid steeds used by the natty mounted police. Although many a droshky is dull of coat and pace, there is always some sleek, active pony pattering by with the silver buckles and ornaments on its black harness agleam and ajingle. For every taxicab there are lines of horse-drawn carriages. Even the high trailers of the trams were once horse cars.

The streets of the capital are humanized by news stands with papers in several languages, excellent illustrated journals, some innocent gaiety and much nudity in silk stockings. With the recent deaths of Joseph Conrad and Henryk Sienkiewicz and the Nobel award to Ladislas Reymont's "The Peasants," one might expect a considerable demand for the works of these Polish literary lions, but I was told that translations of Henry Ford's "My Life and Work," Morand's "Lewis and

A GENIAL VENDER OF SWEETMEATS IN THE STREETS OF WARSAW

PORTERS WAITING FOR JOBS OUTSIDE WARSAW'S MARKET HALLS



A BOATLOAD OF APPLES UNDER THE KIERBEDZ BRIDGE, WARSAW

So distasteful are the Russian names to the Poles that they have changed the name of the Alexander Bridge to that of General Stanislas Kierbedz, who designed it.

Irene," and a Claude Farrère novel were among the best sellers.

LIVE POULTRY SOLVES PROBLEM OF NO COLD STORAGE

The Warsaw cigarette stand consists of a box which can be suspended from the shoulders and carried to a location chosen for the number of potential buyers who pass at any given hour. Brighter still are the soft-drink or refreshment booths with pink and yellow syrups, red and russet apples, shiny rolls of chocolate, and various types of breadstuffs.

There is a certain informality about the markets of Warsaw. The traffic in vegetables and flowers, chaplets of dried mushrooms, milk and eggs, live and dressed poultry, juicy pears and enormous English walnuts, overflows from the two market halls into the streets and courtyards on all sides.

The practice of selling live poultry in a country where cold storage consists of a long winter makes for a more even market. If, after having 20 city women finger over her pet gander, the country woman finds no sale for him, a twist of

THE NEW POLAND HAS TORN DOWN THIS RUSSIAN CATHEDRAL IN WARSAW

The three mosaics over the doors of the west front were among the finest in Europe, and every care was taken to preserve these magnificent works of art during the process of razing (see text below). During the World War the Germans stripped the church of its metal and left it with a leaky roof. The statue in the foreground is that of Prince Joseph Poniatowski, who was made a marshal of France for his brilliant services to Napoleon at the Battle of Leipzig, in 1813.

the wrist ties him up in her shawl and back home he goes (see page 232).

Near the food markets the fronts of several buildings are draped with piece goods, and across the road is a dimly lighted shambles, where the shoddiest of woven goods, comfortless underwear, cardboard suitcases, and ugly finery are sold to those too poor to profit from buying honest goods.

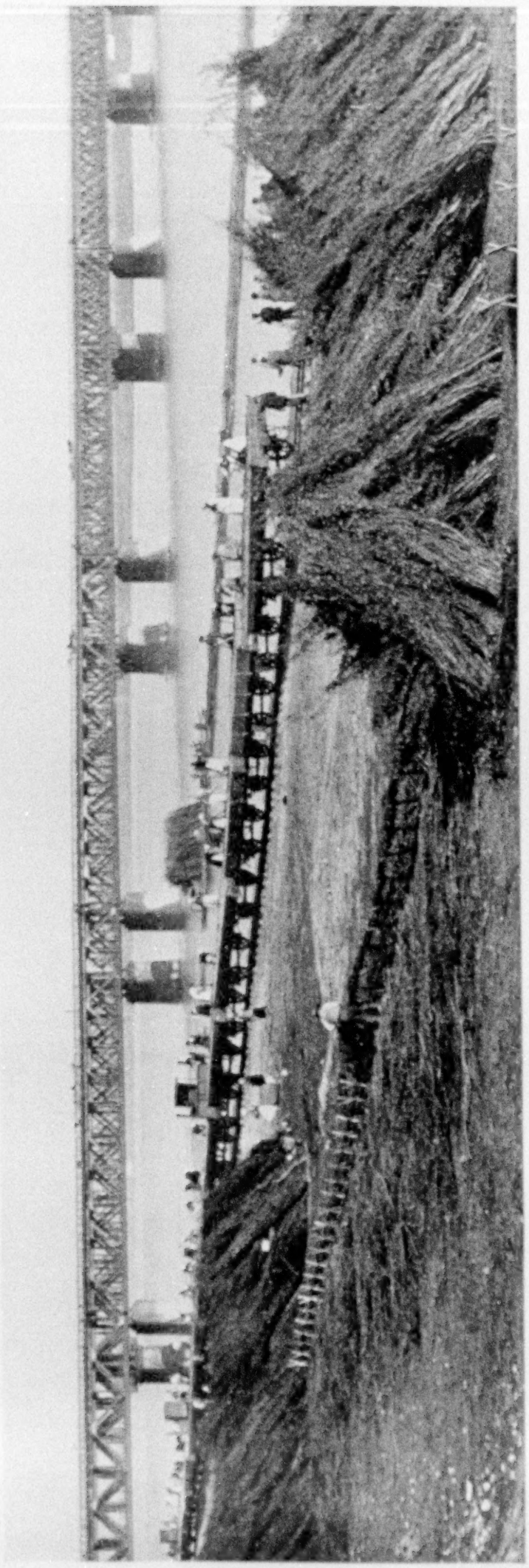
THE NALEWKI, WHERE YIDDISH IS THE NATIVE TONGUE

North of these markets, watched over by bulbous-bodied country women with cheery, honest faces, one comes to the Nalewki, where Yiddish is the native jargon.

The Nalewki differs from Polish Warsaw in that its buildings have no fine façades, but two slovenly backs. Between it and the Vistula there remains the Old Town Square, once the haunt of fashion. Some of the fine carved doorways still hint of ancient glories. The row of medieval houses is, in its general aspect, as fine as anything Warsaw can offer. Hidden away from casual gaze are narrow entrance halls and staircases that once gleamed with the beauty of ivory shoulders, and where natty officers, emerging from their heavy overcoats, disclosed such a Lancers uniform as made even a callow youth look like a man of iron and a breaker of hearts. Here I talked with unkempt residents who disliked me because America's new immigration laws prevent their coming in droves to Ellis Island.

WARSAW REMOVED CHURCH WHICH SYMBOLIZED RUSSIAN OPPRESSION

There is nothing distinctive about the Warsaw skyline. Until recently the domi-



RECLAMATION WORK NEAR THE RAILWAY BRIDGE OVER THE VISTULA (SEE TEXT, PAGE 211)

In the foreground are bundles of brushwood, which are laid between the wooden X frames and bound tightly together, to be sunk at the river's edge. In the middle distance hundreds of women are shoveling dirt from flat cars. Beyond them, in the stream, can be seen a weir of willow withes which are to form a new shore-line of the river along whose banks most of the cities and towns of Poland are found. The basin of the Vistula and its tributaries is one of the largest in Europe.

nating features of the silhouette were the five gilt domes and 240-foot campanile of the Russian Church, which at the time of my visit was being torn down, carefully and expensively (see page 209).

There, in the heart of the heart of Poland, the Russians had built this beautiful but overbearing church, decorated with wonderful mosaics. The ground on which it stood had once been the courtyard of Polish kings.

Standing in the proudest spot in Warsaw, this reminder of Russian oppression was an affront to Polish feeling. It had to come down.

WARSAW'S ROYAL PALACE RIVALS VERSAILLES

Coupled with the paradox of a potentially rich but actually poverty-stricken people paying heavily to destroy the finest building in their capital is that of the victims of repeated plunderings regaining the booty which was taken from them into other lands. From the Zamek and Lazienki palaces, both in the century before the World War and during that conflict, scores of wagonloads of priceless paintings, statues, and tapestries were transported abroad. In accordance with the Treaty of Riga, these art treasures have been returned.

Flanders tapestries dating from 1620 have come back from Red Russia without a stitch broken. Paintings which were evacuated by a hurried

army in retreat before the Germans are back unharmed after years of adventure in disordered Europe.

One treads the beautiful marquetry floors of the spacious Zamek Palace as he does the thick carpets of St. Sophia or the marble courts of the Kalyan Mosque at Bokhara, in flapping slippers.

There was a time when this royal palace was second only to Versailles. Rebuilt and redecorated after many disasters, the palace, now that its paintings and tapestries are back in place, is much the same as it was when Merlini, Bacciarelli, and Canaletto placed their skill at the disposal of Poland's last royal patron of arts.

To-day those spacious floors are empty, those splendid salons devoid of life. The palace remains. The light laughter, the flash of coal-black eyes, the flirtations, intrigues, inanities, and wallflowers which made up the old life of Zamek are gone.

Paintings and statuary, outliving their models, acquire a sardonic irony with age. In a medallion over one of the doors the handsome voluptuary, King Stanislaus, is pictured as Apollo and Catherine the Great as Minerva.

Warsaw's Citadel, with its overworked execution grounds and infamous Pavilion X, was built to punish the Poles for the November Insurrection of 1830. Pavilion X was being torn down when I climbed plaster-cluttered stairways to see the cell where Pilsudski had been imprisoned.

As I passed the barracks, crowded with Polish youth, raw recruits were stuffing straw into bed bags under the supervision of a petty officer. Others were devouring army fare with their fingers.

MORE THAN HALF THE NATION'S CITIES BORDER THE VISTULA

From the Citadel walls one looks down upon the Vistula, whose basin embraces most of Poland (see map, page 213) and on whose banks are more than half of the nation's cities. Sadly neglected until now, it may become as important a waterway as the Rhine or the Seine.

A few dirty steamers tie up to the Warsaw wharves. Under the Kierbedz bridge, women from the country moor their flatboats, piled high with rosy-cheeked apples. Important reclamation works are in progress and a new foreshore is being built here. When I visited the scene hundreds of women, many of them barefoot, were unloading flat cars and shoveling the earth down the new bank to fill up the space behind the weir of willow withes (see illustration on opposite page).

After the dirt and idleness of the Citadel, that busy train of flat cars, dotted with bright bandanas and sweaters, was a pleasant sight.

A BRILLIANT SPECTACLE IS PROVIDED BY THE DEVOUT PEASANTS

The nation offers no spectacle more colorful than the Sunday procession in Lowicz (see page 215). In rude farm wagons and on foot, the peasants come from humble villages in the widespread plain whence Poland gets its name.

The abbey church, walled into a grassy inclosure, backs up to a great cobbled square. On fine Sundays, each of the three entrances is a hovering place for a rainbow whose colors, intensified by fixing them in stiff, sturdy homespun, bell out in broad skirts and bright aprons, below which even a peasant foot, if confined in a shiny high shoe with laces matching some color of the costume, has a pleasing grace.

Those shoes! Surely Cinderella's sisters suffered less from footwear than these Polish women do. Economy puts a limit on the time such finery may be worn, but comfort also vies with pride. Up to the town's edge the women stride, barefoot and carefree, with their shoes and stockings wrapped in a corner of their capes or dangling from their hands.

At the outskirts of the town they sit down on plaid steamer rugs, draw on their shoes with many a sigh and flush of cheek, tie with the greatest nicety the long laces whose crisscross decorates the front, and march bravely, eagerly, on to the one colorful event of their drab week of toil (see page 214).

The men, wearing long frogged coats and orange trousers stuffed into well-blacked boots, stand in somber groups, from which the eye is lured away by gleaming masses of creamy silken head-shawls, long of fringe and worn without a wrinkle.

As the women stand packed together in a church whose altars, bright with gilded

© Jan Bulhak

THE "HOUSE OF THE SHIP"

This venerable Warsaw residence is supposed to have been the headquarters of one of the importing guilds or associations of merchants which played so prominent a rôle in the medieval history of the Baltic countries.

seraphim, are clothed with rainbow wool like that of apron and of skirt, the brilliant colors of their lower garments are not disclosed.

COLOR TO THE HEART'S DELIGHT IN LOWICZ

Occasionally, from a pure-white scarf some bold and highly colored flower stands out or, above the long braids of a girl who is engaged, a coronet of gold and artificial flowers woos the eye. But, lustrous as that mass of headshawls is, gleam though they do in the mellow light of many candles and few windows, there is little in that modest display to suggest the riotous rainbow that will soon flow forth from the main church door, swing south across the cobbled square, and break into a thousand bright fragments before the demands of family cares and beaux, many of them spick and span soldiers and firemen in shining helmets of brass, who parade their finery in a vain effort to preserve male ascendancy.

Outside the church the women wait as though restrained by some invisible barrier which will yield only to numbers. Then they turn to the left and start the half-hour procession in which purple and gold, canary and amaranth, orange and royal blue, chocolate, red-brown and olive-green colors glow and fade away in the crowd.

Once the women dyed their own wool; now that is done commercially. A bright hank suspended outside a shop proclaims where the highly colored yarns are sold.

As though such advertising methods were necessary among peasant women! Hidden in obscure Lowicz courtyards are dye shops whose reputation reaches far and wide among the villages and whose colors have graced wedding, christening, and church parade for many a year. In the small peasant cottages a loom takes valuable space; so many women now buy their heavy woolen fabric ready made.

Behind the loom are the bobbins, bulging with color, a dozen or so in line. The weaver chooses the one his fancy dictates and shoots the shuttle once or many times,

Drawn by A. H. Bumstead

A SKETCH MAP OF POLAND

thus leaving what will be a veritable hair-line of lemon or a broad band of blue.

On Sundays the peasants frankly "dress up," as unspoiled children do, taking pride in the newness of the fabric, in its stiffness and the brilliancy of its chromatic scale. Homely though the women are, sturdy rather than lithe, the calm assurance and downright pleasure with which they parade their clothes makes the most blasé visitor smile with them at this unblushing display.

WILNO IS SURROUNDED BY LARGE ESTATES

All about Wilno, northernmost of Poland's cities, there still remain large estates whose owners live in almost feudal magnificence, unaffected by such agrarian reforms as have split up the vast domains of Esthonia and Latvia.

Wilno has a laconic but suggestive inscription whose few strokes constitute a shorthand history of more than three centuries. On the wall of the university is a small marble plaque with a shield bearing the white eagle of Poland and the plunging horse of the Lithuanian arms. Above is a crown. Below are three figures and three words:

1578 — 1803 — 1919
VNIWERSITET
STEFANA BATOREGO

In 1578 Stephen Bathory promoted a small parochial school to the rank of academy, which soon drew to it many Polish intellectuals. Then came war, famine, and pestilence to decimate the population.

Though made the pagan capital of Lithuania in 1323, Wilno became Chris-

EXCHANGING SHOES FOR COMFORT

For a large part of the year Polish peasant women wear no shoes or stockings except on state occasions, and their broad feet are more accustomed to the rough spots in the road than to the narrowness of their shoes, which are not designed for use, but for show. When the church parade at Lowicz is over, the women retire to this sylvan spot beside a stream and ease their feet by taking off their shoes and stockings, which are then carried in the hand or over the shoulder (see, also, text, page 211).

tian in 1387, when Wladislaus Jagiello, Grand Prince of Lithuania, married Jadwiga, or Hedwig, Princess of Poland, and thus became King of Poland.

Poland seems never fully to have appreciated the service rendered to their land and their church by Jadwiga, who forsook a love dream to convert and marry the last of the pagan princes, and thus brought into the Christian fold a tribe of barbarians who had defended their rude faith against the force of Prussia and the Teutonic Knights. Her sacrifice united the lands of Lithuania and Poland under one control, so that the decisive battle of Grunwald was won, and she founded the dynasty under which Poland rose to the zenith of its extent and power.

Though she sacrificed her love to become Poland's greatest heroine, her love of the land worked many miracles, not the least of which was the Act of Horodlo (1413), of which this is a part:

"Nor can that endure which has not its foundation upon love. For love alone diminishes not, but shines with its own light; makes an end of discord, softens the fires of hate, restores peace in the world, brings together the sundered, redresses wrongs, aids all and injures none. And whoso invokes its aid will find peace and safety and have no fear of future ill."

One hundred fifty-six years later that act was confirmed by a definite union which lasted until Poland fell.

CATHERINE THE GREAT GIVES POLAND A KING

Among the descendants of the Jagiello line were two Czartoryski brothers, whose patriotic efforts stirred the jealousy of other Polish families. Rather than suffer defeat at the hands of their fellow-countrymen, the Czartoryskis asked for aid from Russia. Catherine, ambitious pupil of Peter the Great, was quick to seize the chance.

Russian aid came in the form of Russian rifles, which drove from Warsaw

OUTSIDE THE CHURCH DOOR AT LOWICZ AT THE CLOSE OF SERVICE

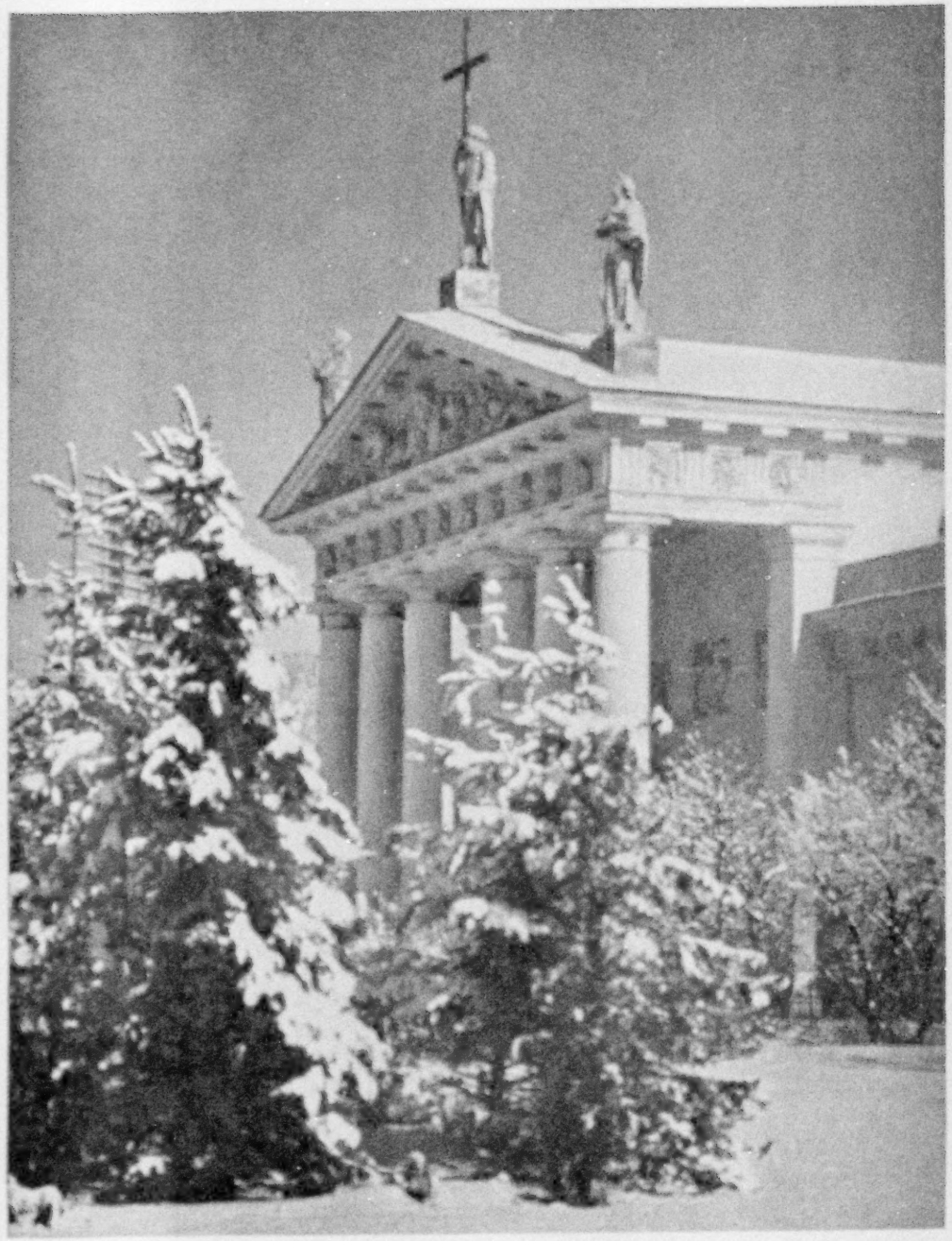
The scene on the inside, before the women put on their shawls, is very colorful, especially if one climbs to the organ loft and looks down upon the whole congregation.

A PEASANT MOTHER AND SON OF LOWICZ

The reputation that Polish women have for beauty has been earned in the cities and among the chic classes rather than among the peasants. Here is an essentially Slavic and peasant face, needing all the help a headshawl oval can give it to lengthen it and narrow it.

WAITING OUTSIDE THE ABBEY CHURCH AT LOWICZ

A LOWICZ WOMAN AND HER LITTLE DAUGHTER



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THE CATHEDRAL OF SAINT STANISLAUS, WILNO

This church, in the form of a Greek temple, was founded in 1387, on the site of a sanctuary to a pagan god. Six massive columns form the portico. The statues are of Saints Helena, Stanislaus, and Casimir.

© Jan Bulhak

SAINT CASIMIR CHAPEL IN THE SAINT STANISLAUS CATHEDRAL

In this baroque marble chapel the traveler's attention is called to the silver coffin of Saint Casimir and silver statues of many of Poland's kings and queens.

ENTRANCE TO THE CATHEDRAL OF SAINT STANISLAUS

© Jan Bulhak

A WISTFUL MAID OF WILNO

BITS OF CHOCOLATE OVERCAME THEIR COYNESS

Unlike many of the Warsaw children, there seemed to be no mercenary quality in these village youngsters, but until candy was tried, there was something lacking in the achievement of an entente cordiale between subjects and photographer.

HERE IS A DEVOUT PEOPLE

Near the entrance to many Polish churches there are small plaques bearing a bronze circle with a cross on it, with the inscription *Iesus Homo, Christus Deus.* As the people leave the church they kiss this plaque. Often there is a crucifix near at hand.

Photograph by Jan Bulhak

THOUSANDS GATHERED BEFORE THE OSTRA BRAMA CHAPEL

This chapel in Wilno is situated above the city's 16th-century town gate. This street is nearly always filled with kneeling worshipers, but the wonder-working image of the Virgin is not visible except during divine service, when the chapel windows are open.

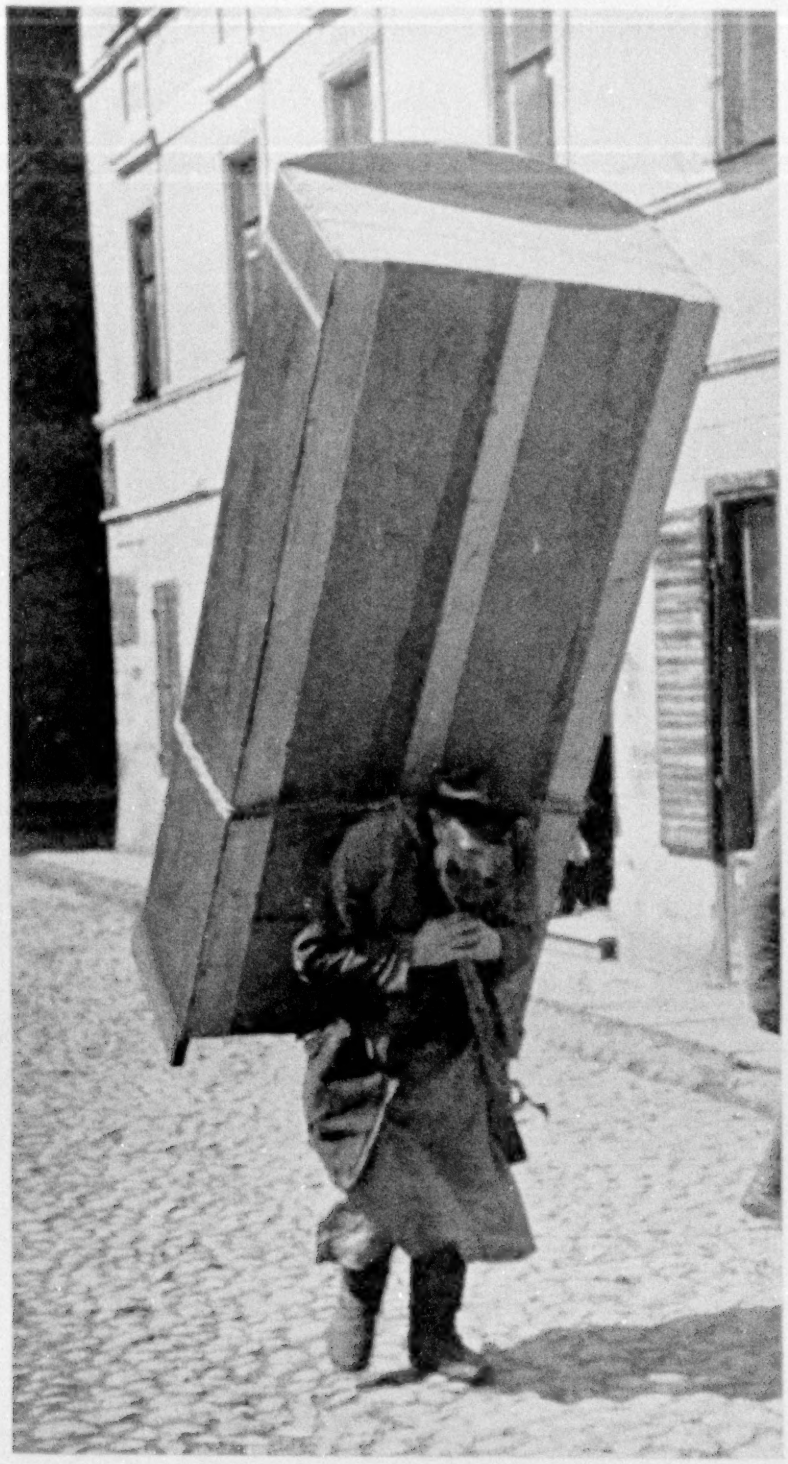
those members of the Diet unfavorable to the patriotic plans of the Czartoryskis. Catherine's favorite was lifted to the throne of Poland.

After the partitions the Czartoryskis were so persistent in their patriotism that Catherine found it politic to hold Prince Adam Czartoryski as hostage, in which rôle he made himself so charming that he became aide-de-camp to Catherine's grandson, Grand Duke Alexander.

When that disciple of Rousseau became Tsar he transformed the moribund Academy of Wilno into a university and named his former aide-de-camp curator. So much for the "1803" on the plaque, a Polish tribute to a Russian Tsar.

Czartoryski lost no time in making his new university a cultural and propaganda center, with an independent Poland as its ideal. But Czartoryski and the Polish nobility soon deserted Alexander to follow Napoleon's rising star, and Polish youths to the number of 70,000 rushed to assume the dashing Lancers uniform, which has transformed fat tenors into military figures ever since.

When Napoleon's star was dimmed by the flames of burning Moscow, in whose sacking Polish legionnaires had played a part, the Polish gentry found themselves, for the 'steenth time, backing the wrong horse.



Photograph from Ernest Peterffy

A HUMAN EXPRESS WAGON

With the Insurrection of 1832 the University of Wilno was suppressed. In 1919 its opening was one of the first acts of the Poles after freeing Wilno from the Bolsheviks at Eastertime. Education, long secretly purchased at a great price, now seems invaluable though free.

POLAND'S CHIEF WATERING PLACE

Gdynia, my next goal, is in the same latitude as Wilno, but Lithuania, East Prussia, and the Free City of Danzig separate the two.

Gdynia is entirely off the Vistula, is remote from the heart of Poland, and is situated on a shallow bay sheltered only by a sand fishhook ending in Hel. This last is a spotless town, whose half doors suggest the Hollanders, Zeelanders, and Frisians whom Albert the Bear welcomed as colonists and to whom the portion of the Free City of Danzig, which lies below sea level, owes its being.

Gdynia consists of two piers, many incongruous villas, an ambitious but deserted band-shell, a bulky Pharos, and a fishing strand cobwebbed with nets. There are a casino and a hotel called the Polish Riviera. If the long pier which ties the shelving shore to the shallow sea proves

Photograph from Ernest Peterffy

THE STAND OF A GRAIN AND SEED VENDER IN THE MARKET PLACE

Note on the right the dried mushrooms which are suspended on a cord in big bunches.

MAKING A POTATO PILE FOR THE WINTER

This oblong heap will be covered over with straw and then with earth. A small chimney will provide ventilation through the top. Much of Poland's enormous potato crop is converted into alcohol.

© Jan Bulhak

CHÂTEAU DE MIR IN NORTHERN POLAND

Built near the close of the 15th century, this historic stronghold withstood sieges by Tatars, Russians, and Swedes, but was finally captured and partially destroyed by the Swedes, under Charles XII, in 1706. It is at present owned by a Polish prince, who is taking great pains to restore it.

a failure, the pleasure pier may offset the loss, for it is decreed that Gdynia is to be the rival of Zobbot as well as of Danzig.

For the present, the beach at Gdynia is charming enough on one of those late October days when the hills are golden and white clouds scurry across the blue. The fisheries use fine-meshed nets, some of which, suspended from high frames, sway in the biting breeze. Others hang from rude stakes, so that they ripple in the wind, their superimposed meshes making an ever-changing, watered-silk design, behind which dark-clothed fishers move like phantoms (see page 225).

The old song, "For men must work and women must weep; And the sooner it's over, the sooner to sleep," has been improved on by the Kaszubes tribesmen of mysterious origin who dwell in this Polish corridor. They have discovered that by omitting the weeping and making the women do a full share of the shore work, the well-earned sleep may come earlier for all hands.

Antiquated boats, sawed in halves and upended on the beach, form adequate shelters for the tackle. Old women plod back and forth across the shifting sands, bent low under burdens of driftwood. In spite of gawky piers and gaudy villas, Gdynia is still picturesque.

THE MOST MODERN CITY OF THE REPUBLIC

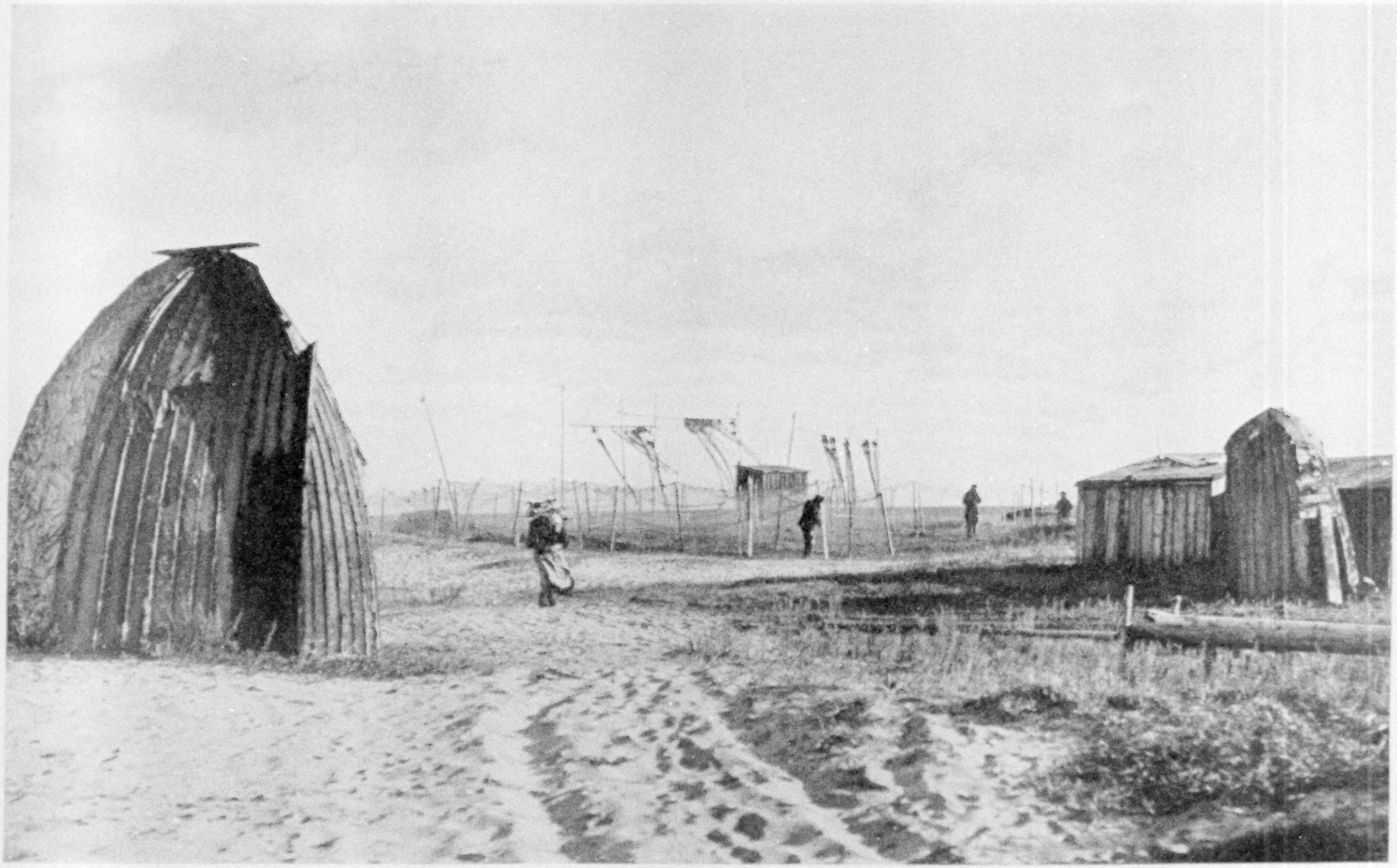
Poznan is the most thoroughly Polish and most modern city in the republic. The morning of my arrival this cradle of the Polish race was half hid by a mist which gave grace to the bulky palace of the Kaiser, added just the proper note of northern softness to the classic façade of the Raczynski Library, and banished the ugly from the buildings overhanging the Warta, in whose dark waters great blocks of ice were slowly floating.

In the Poznan Cathedral rest the ashes of Poland's first kings, and here their statues stand like royal actors in a historical pageant.

There is something splendid about the little gold chapel in this dusty old church on the tranquil island where the first

A CORNER PUMP IN ONE OF THE MAIN STREETS

The shawl and apron reign in Wilno, the northernmost of Poland's cities, as elsewhere in Slavic lands.

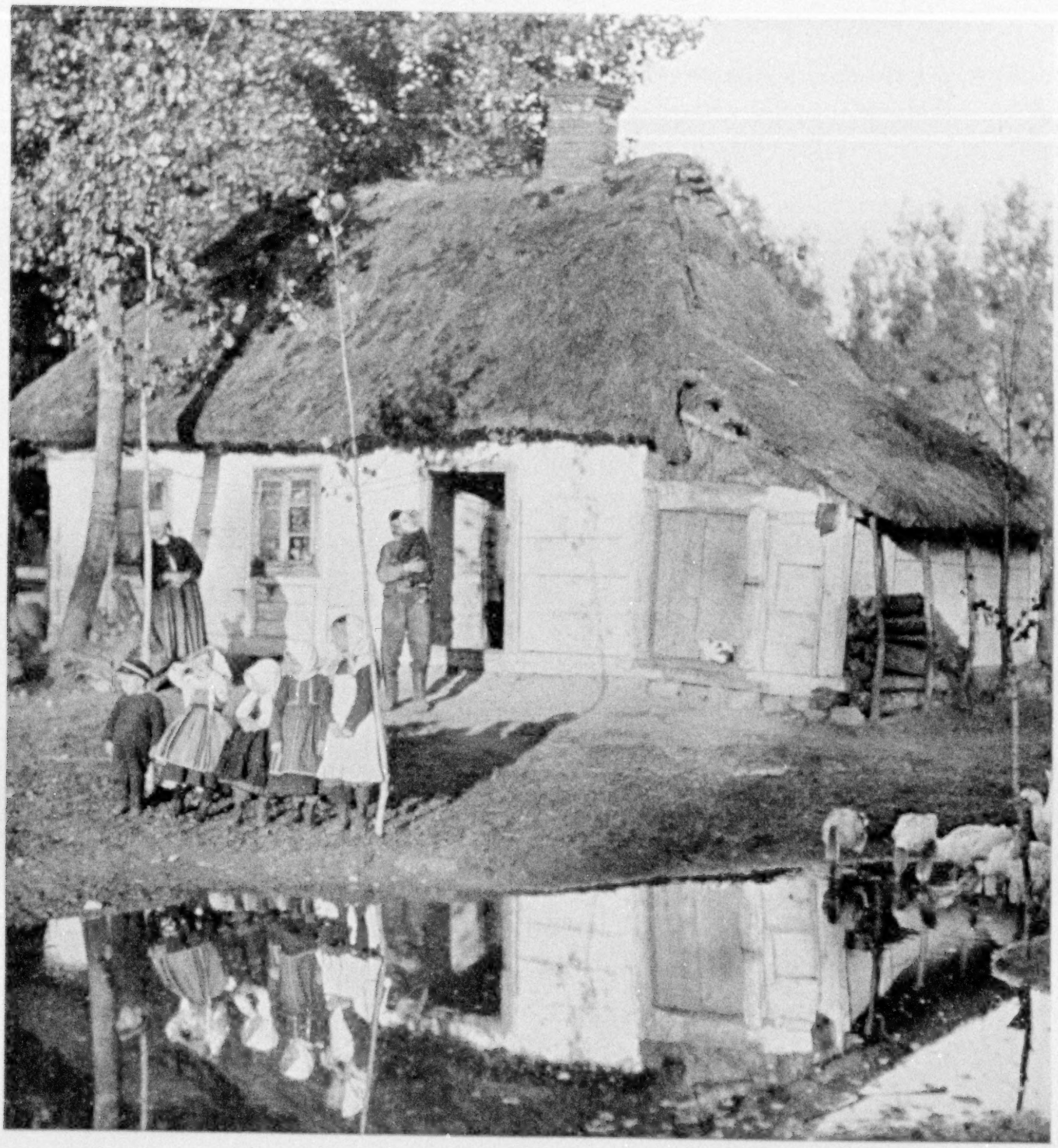


WHERE POLAND DREAMS OF BUILDING HER NEW YORK

Sodden sand; half-boats upended and made into shelters; a peasant woman toiling homeward under a weight of driftwood; the almost gauzelike nets of the fishers, most of them hung out on notched posts driven into the sand, but some swinging their heavy weights before the power of the biting cold breeze—all these must give way before the march of progress when Gdynia becomes a great port (see text, pages 221 and 223).

PREPARING FLAX FOR THE SPINNING WHEEL

In October the flax has been soaked and the fibers beaten out or spread between the jaws of what looks like a blunt print trimmer. Then the women sit in the shade or shelter of the overhanging eaves and comb the fibers through upturned steel brushes until the short, useless strands are caught in the teeth of the comb and the long fibers can be tied into neat bunches.



A PEASANT HOUSEHOLD IN POPUW

settlement stood, just as Paris grew up around the Cité on which Notre Dame was to rise.

Fire and flood have assailed that old cathedral time and again, and although it has not always withstood, it withstands. So with the Poles. Defeats have been many and humiliations common, but to-day the Kaiser's palace is given over to university halls thronged with Polish students, and the huge building which was the German Colonization Office now serves a like purpose for the Poles. The bulky German theater is now the opera. There I heard "Carmen" sung in Polish and caught another sidelight on Poland.

For the last few years writers have mentioned the "New Poland" as though discussing an actuality. When the downfall of the Central Powers occurred, the world was surprised by the cöoperation between three groups, nominally Russian, German, and Austrian, but actually Polish. Oppression by three distinct powers had done for the Poles what they, in the later days of the kingdom, had not been able to do for themselves—given them a national consciousness. But New Poland is still in the process of being born.

Poznan gives one an unusual opportunity to study the Poles, not because they are more Polish than their brothers in

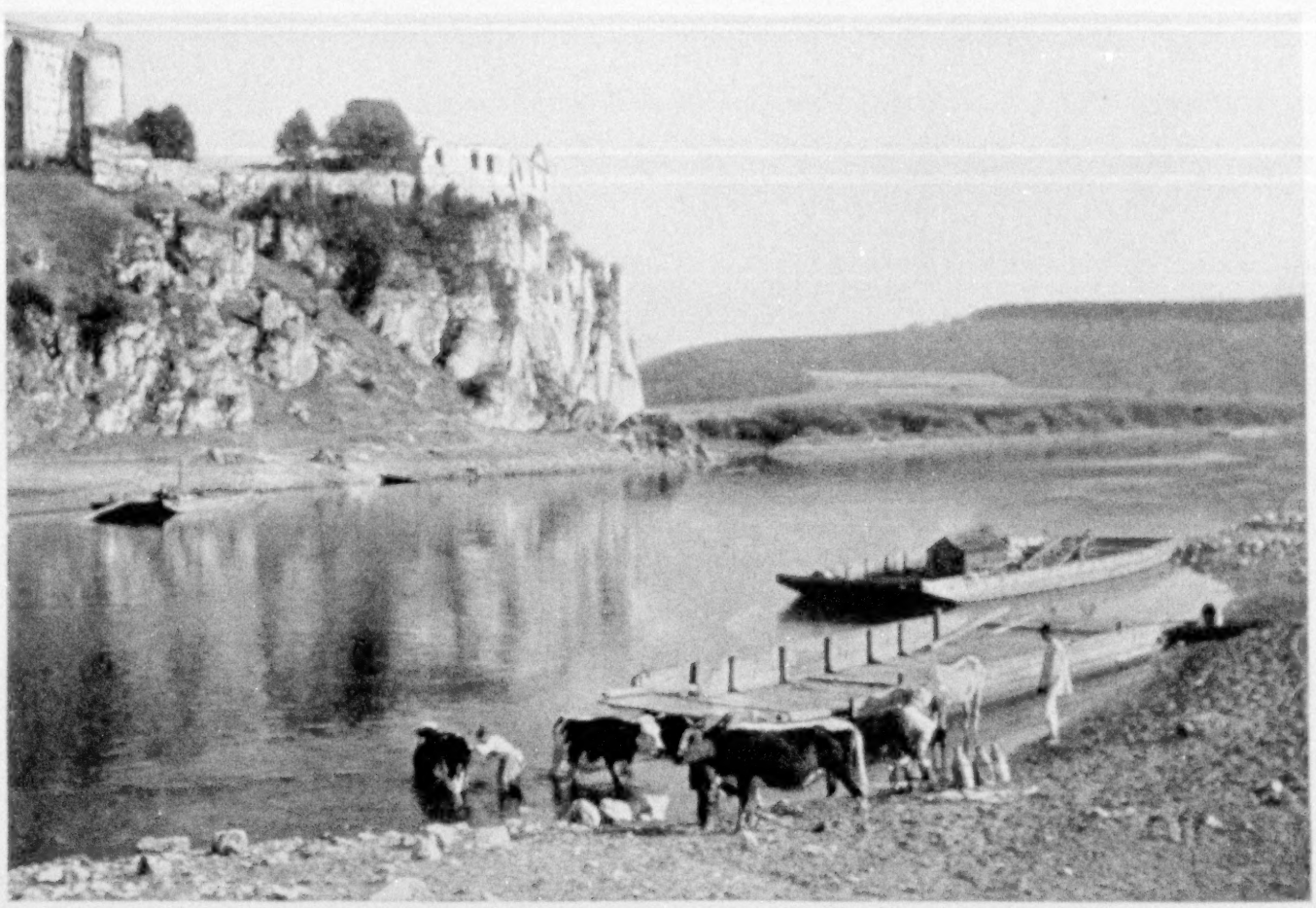
LOOKING DOWN MAIN STREET, WHICH IS POPUW (SEE MAP, PAGE 213)

"Hearths and homes" is suggested by the smoke, but as a matter of fact there is probably not a hearth in the village. A small stove, built into a corner of the room, uses less wood and causes fewer sore eyes.

Photograph by J. Krieger

THE WAWEL, OR HILL OF KINGS, AT KRAKOW, AS SEEN FROM THE BRIDGE TO THE WEST (SEE PAGES 233-235)

The Vistula (Polish, Wisla; German, Weichsel) here makes a sharp curve to the south and thus avoids having anything to do with the city proper. To the left of the Wawel is a large market place where horses are sold at regular intervals.



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THE REMAINS OF THE BENEDICTINE CONVENT OF TYNIEC, OVERHANGING THE VISTULA NEAR KRAKOW

OBLIGING CUSTOMERS IN THE LWOW FISH MARKET (SEE TEXT, PAGE 239)

Warsaw or Lwow, but because, since they form 95 per cent of the population and are among the most progressive of their race, each can be less aggressively Polish than in a city where they form a bare majority of the citizens.

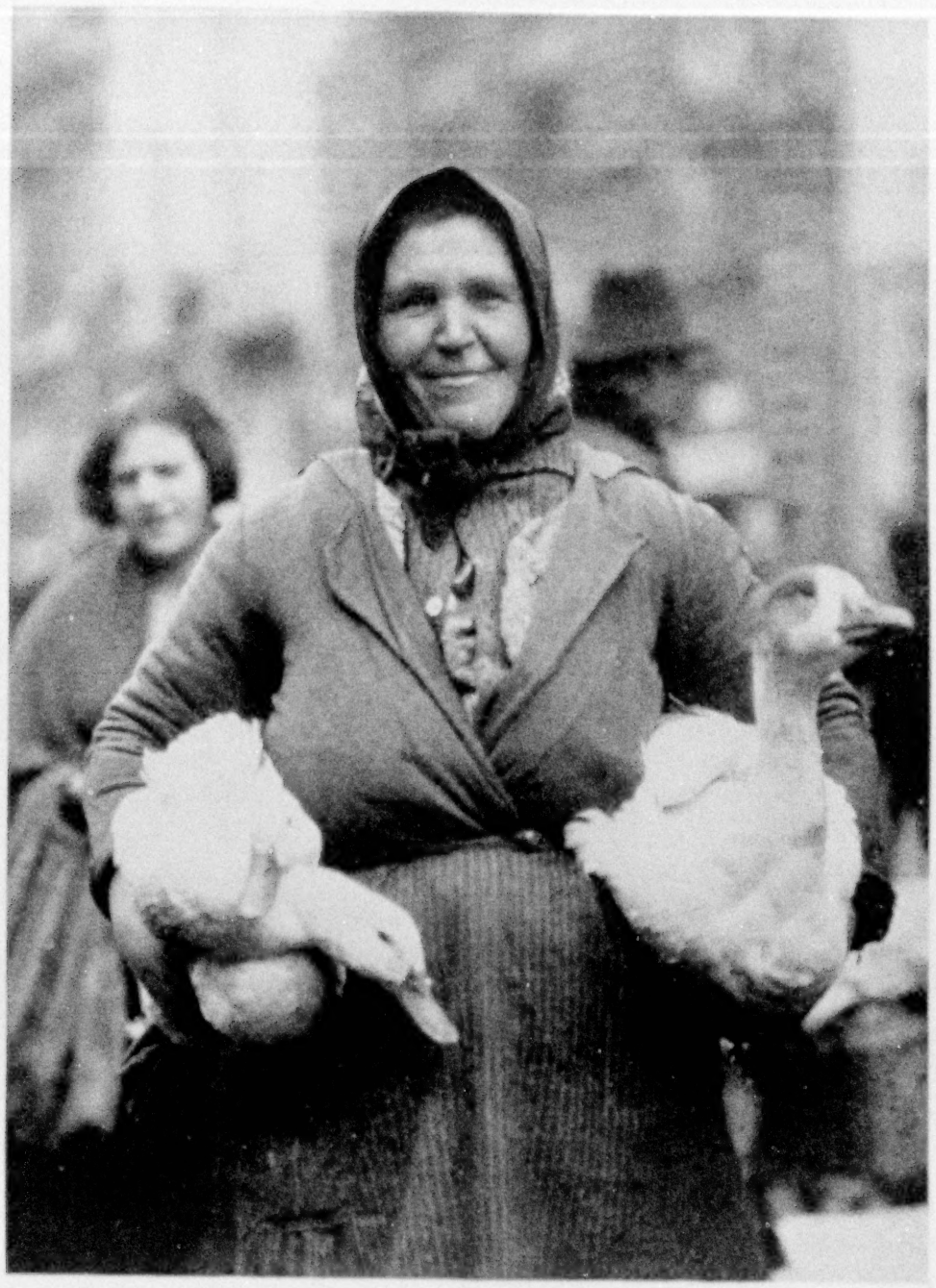
ZAKOPANE IS MADE GAY BY THE GORALS

Along Poland's only natural boundary, the Carpathians, two salients project southward, one into the jumble of mountains called the Tatras, whose further slopes are in Czechoslovakia; the other to the bank of the Czeremosz, over against Bukowina. In these two salients are to be found two of the most interesting peoples in the Polish complex (see map, page 213).

In the Tatras lies Zakopane, Poland's chief mountain resort, with a beautiful situation, several large sanitariums for weak-lunged patients, and the most charming group of villas in Poland. Many of them, though larger and finer, are built in the same "Zakopane" style as the modest wooden houses, which were there before Dr. Chalubinski "discovered" the place, in 1873, and the railway came, in 1886 (see page 234).

There are attractive promenades, plenty of mountains to climb, an active Tatra Society serving those who don't do all their exploring by automobile, and up in the mountains a gem of a lake called the "Eye of the Sea." Either it is absolutely without bottom or the tradition that it is connected with the ocean is without foundation. But it is a very charming lake.

Round about Zakopane live the Gorals, or mountaineers, who come down to the church on Sunday and turn the terrace into a pansy bed and the double staircase into cascades of color; but, bright as is the costume of the women, it is the men who lend the more picturesque note to the group.



A STURDY PEASANT WITH HER STOCK IN TRADE UNDER HER ARMS

White homespun trousers, almost like felt, coming low over instep and heel and shaped in to fit the legs, with a red pom-pom above the shoe and a Persian rug design in fresh colors in front of the pockets, are the most striking features. But there are dull white and shiny yellow coats or coatees decorated with appliqué work and stitched or tattooed designs. The hat of black felt, with a single string of white beads or sea shells for a band, is shaped like the tin hat of the doughboy.

GOING TO MARKET

If the owner of the goose finds no purchaser, she will tuck it under her arm and trudge home, to come to Lwow again another day.

In Zakopane and Kosow the lady visitors wear sheepskin coats colored a pleasing tan suede, trimmed with brown wool and so gracefully fitted that they would add outdoor sauciness to Lake Placid itself. Matching these are heavy wool socks rolled down over the high shoe tops to reveal silk stockings (see page 236).

SALT MINES CONVERTED INTO A DIME MUSEUM

The young men in Goral costume are the handsomest I saw in Poland—fresh-cheeked, deep-chested, lithe young giants, who looked like university football men in a college play. Probably not all of them were Gorals, for on going to Nowy Targ I found the mountaineer costume worn by townsmen and farmers of the plain.

Years ago the salt mines of Wieliczka appealed to my youthful imagination. Thousands of workers toiling hundreds of feet below ground, and there having chapels, a ballroom, a post office, and buffets. My childish assumption was that the workers lived underground for sunless days and starless nights on end, like Injun Joe in McDougal's cave.

The waiting room gives a clue to what follows, and only those with a passion for curiosities should descend into the mine. Before one has entered the hoist, he is asked to buy souvenir post cards and crude carvings of the white eagle or some other popular figure in rock salt. The whole place has the atmosphere, not of a salt mine employing 1,500 workers, but a subterranean dime museum with a dollar admission fee.

There is a huge chapel with rock-salt saints, well preserved in spite of their age. For all I know, Lot's wife is there. The rock-salt chandeliers have almost as much glitter as glass. There is a ballroom with a gummy floor of rock salt and a buffet as empty as the ballroom itself.

The chapel service is held once a year. The ballroom is used at infrequent intervals, but the post box is important. A man follows the visitors hundreds of feet below ground with a tray of souvenir post cards in order to induce them to use this abysmal mail box.

I wanted to see some of the 1,500 work-

FOUR YOUNG FOLKS OF SOKOLOWKA

ers who mine salt, but it is forbidden to visit the parts of the mine which are being exploited.

KRAKOW, PRIZE CITY OF POLAND

The prize city of Poland is Krakow. Jagiello came all the way from Lithuania to be baptized and made a Pole-in-law on the Wawel—Hill of Kings—after Casimir the Great, "who found a Poland of wood and left behind him a Poland of stone," had carried Krakow to such heights of glory as no other Polish city ever reached.

Legend pictures Casimir as a Polish Ahasuerus, under whom the Jews won special privileges because of his infatuation for a contemporary Esther, but it was rather Krakow's usefulness as a trade mart which won it continental favor and support.

The grain of Hungary, the silks of Italy, the amber of Danzig, and the spices of the East passed through Krakow. Men trusted their lives to yew bows from Galicia and her oaks furnished the framework for many a ship.

But Columbus and the Turks dealt Krakow blows from which it never recovered. The former's discovery of America turned men's thoughts away while the Turks, cutting the trade route to the East,

ZAKOPANE FROM THE HILLS TO THE NORTHWEST (SEE PAGE 231), WITH THE POLAND-CZECHOSLOVAKIA BOUNDARY LINE OF MOUNTAINS IN THE BACKGROUND

In summer, visitors who have the proper visas wander back and forth between the two countries, since some of the main sights on opposite sides of the political boundary are nearer to each other than are similar sites all on one side of the line.

smashed the wheel of land-born commerce of which Krakow was the hub. The royal court deserted this charming city for Warsaw and disease humbled what had been a proud metropolis.

From the station one follows the beautiful gardens, which have replaced the medieval moat and walls, and almost immediately comes upon the Rondel, a circular barbican spired with pepper-box towers and looking strangely old-fashioned in front of the new building of the Bank of Poland and the Grunwald Monument, which Paderewski gave to the nation five hundred years after the Polish victory.

KRAKOW HAS ONE OF THE FINEST SQUARES IN EUROPE

Through the one surviving gate out of six, one goes past a small, shadowy shrine set in the wall and in a few minutes stands in one of the finest squares in Europe. On the right is the tower of the old town hall. A fascinating market hall fills the center and the Church of Panna Marya lifts its two unequal towers at the left. Later, one comes upon the restored chapel of St. Adalbert, Apostle to the Poles, now attended by cabbies and surrounded by cobbles, but once hidden in pagan, primeval forest.

Ten minutes farther on, one reaches the Wawel (see page 229)—cathedral, palace, fortress, and national monument—once bought by the Poles to free it from Austrian troops and presented to the Austrian Emperor. Each donor of funds for restoring the historic buildings has his name on one of the blocks which form the lower walls.

The Panna Marya Church stands out not only above the many churches of the former capital, but of all Poland. Coming in from cold streets where ragged beggars cringe beside the door, one stands in wonder under a vault second only to that of Strasbourg.

The church warms the eye with its polychrome mural decorations and rests the soul with its vast peacefulness. At the far end, there is the glitter of candles and above a wonderful altar screen, depicting scenes from the life of Mary and Jesus, is rich stained glass, seemingly brighter than the bleak day outside.

In Krakow and throughout Little Poland, or Galicia, one senses the greater degree of freedom and autonomy which the Austrian Poles enjoyed. Street names needed no changing with the advent of Polish liberty. The Mickiewicz monument was not hidden in a churchyard, as in Poznan, but stood foursquare to the view on the great market place.

The most famous painting in the National Museum at Krakow is Siemiradzki's "The Torches of Nero," in which the Cæsar, reclining in his gorgeous chair, carried by Numidian slaves and with his pet tiger beside him, sits in the midst of an orgy in his gardens and watches the torches being applied to the inflammable material in which the Christian martyrs are wrapped. It is a picture of the jazz age of Rome, when snowy togas were stained with wine and Christian beards with blood.

One must turn aside from Siemiradzki to Sienkiewicz to get the full meaning of the picture. In casting about for a character who could personify oppression and tsardom, stupefied by its own power, both painter and novelist, as though by common consent, chose Nero. Both used the early Christian martyrs as prototypes of the Poles.

The lovely Lygea and Ursus, who saved her, were Lybiens or Sarmatians, ancestors of the Poles when the Slavic tide inundated much of Prussia.

THE NATIONAL MUSEUM REFLECTS THE NATION

Matejko and Siemiradzki had something of the grand manner of a Michelangelo; but there are human touches in the National Museum. Chelmonski's lonely shepherd boy, wooing his violin in the midst of an immense plain, a fitting companion piece to Millet's "The Shepherdess"; Falat's brightly dressed spinner, who wonders whether to welcome or repel the advances her colorful dress and personal charm have inspired; Arthur Grottger's gentle damning of war in the "Lithuania" series; Franciszek Streit's Polish counterparts of Huck Finn and Tom Sawyer; and, most appealing of all, Malczewski's picture of blonde death in a brown hut furnished with tawny furs.

All these show such painstaking care and feeling as Chopin poured into his music, Copernicus and Mme. Curie into scientific studies, Paderewski into piano-

APPLIQUÉ WORK IN SEVERAL COLORS OF LEATHER AND TWO REGULATION HAIR-CUTS OF KOSOW

Both summer and winter styles of hats are here seen, though the straw lacks the peculiar hatband which one finds among the Ruthenians and Huzuls.

playing, Conrad into "Lord Jim," and Reymont into "The Peasants."

THE RYNEK BY MOONLIGHT

I first saw the Rynek, Krakow's great square, by moonlight, between trains, and never again was I able to find as much romance there, even on the night when the vast expanse was flaming with the torches and transparencies of a student parade representing one of the oldest and most famous universities of Europe; but even on that perfect night mob psychology got the better of me. Twice I turned aside from the big show to see what the people were most interested in.

The first crowd was looking at a poster showing a young ruler being hoisted from his throne, not, as is traditional, by his own petard, but by a looped rope depending from the ceiling.

The second crowd was denser. A transparency pictured a fair lady whose pearly teeth were the result of using somebody's toothpaste. Due to some mysterious mechanics, she opened and closed her eyes

COQUETTING WITH THE CAMERA

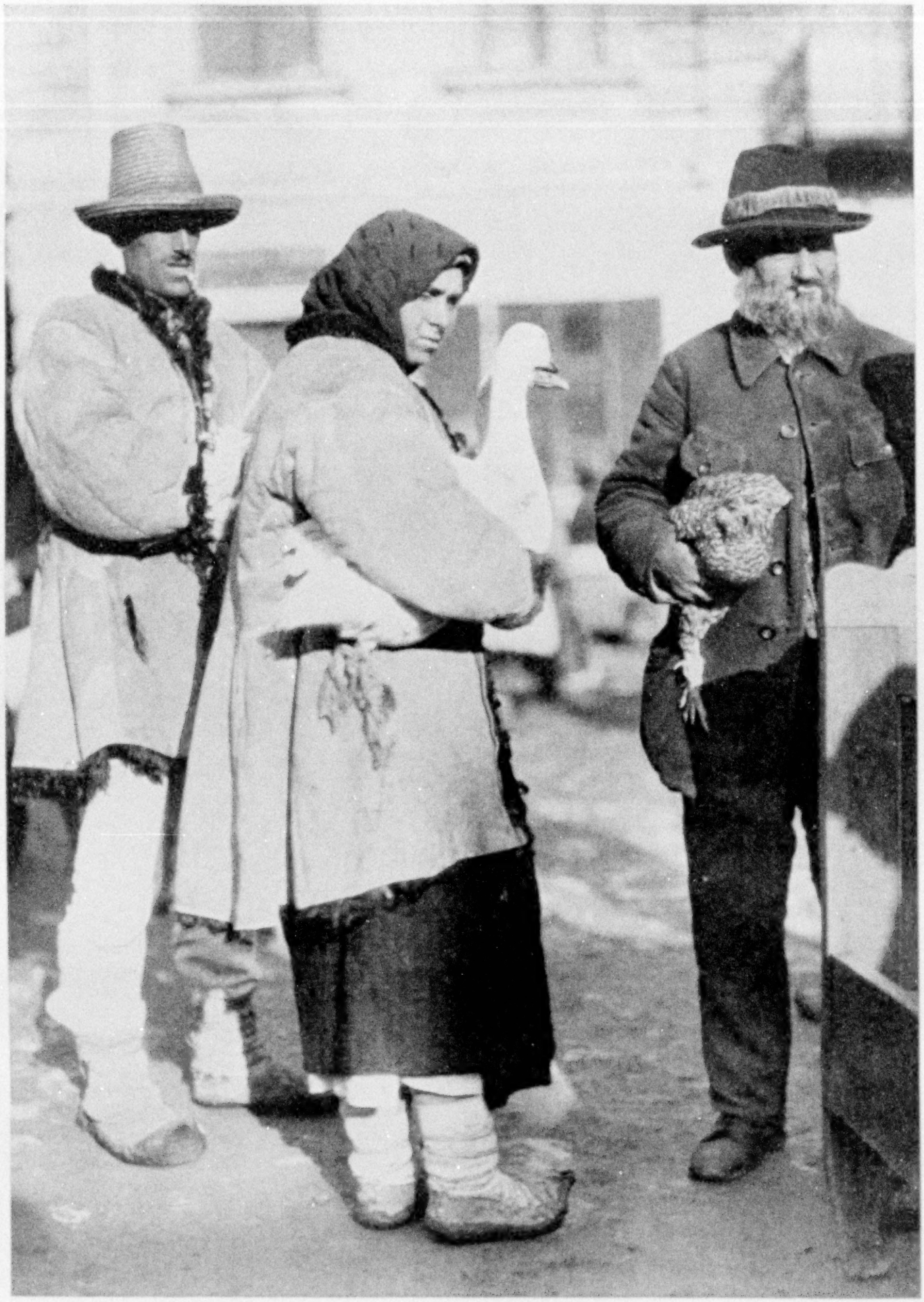
The girl was pretty and she simply loved to play tag with the author. Although she did not forbid his taking her picture, she always just prevented it by stepping behind a friend or turning her back. It was a good game and both enjoyed it. She finally rewarded the camera with this fleeting glimpse.

as naturally as a fifty-cent doll. How she did it I do not know. In these glorious days of science, there are so many more things to be ignorant about than formerly.

In Krakow there are other things more interesting than markets, but in Lwow there aren't. Lwow, Léopol, Lemberg, Leopolis, The City of Lions, The Nest of Heroes—the city has as many aliases as a confidence man. On the station is the inscription "LEOPOLIS SEMPER FIDELIS." Considering the frequent changes of ownership and government, either the "always" or the "faithful" must be poetic license.

LWOW'S UNIVERSITY HAS COME TO LIFE

Here and there in its wide area there is an outcropping of hills whose steep slopes are given over to beautiful parks heavily wooded with splendid trees. Barracks are everywhere. Lwow has never recovered from the rôle of fortress, which it has played ever since the Ru-



COUNTRY FOLK COME TO THE "CASH AND CARRY" MARKET

Kosow is a shoestring town lying between the dry bed of a river and a fantastic cliff. It is famous for its "kilims"—hand-woven, double-faced rugs of unusual pattern. One of the most important sanitariums of the republic is located in this corner of Poland, which is noted for its fine climate.

thenians built it as a defense against the Tatars.

Lwow's place as capital of a now and then autonomous Galicia won it many imposing buildings, upon which Italian architects and German sculptors lavished much skill. The old University, dating from 1660, has taken on new life with the coming of liberty. There is to be another, solely for Ruthenian students from East Galicia, where this "racial minority," separated by nothing but an imaginary line from 25,000,000 racial and religious brothers in the Ukraine, outnumber the Poles two to one.

The main breaks in the Lwow sky line, aside from its hill parks and plain Ratusz tower, are made by church spires, domes, and steeples. Lwow has three cathedrals with a Catholic archbishop, a Uniat Metropolitan, and an Armenian bishop. None of these churches serves the majority of people one meets—sinister figures in *halats*, black felt hats with flat brims, heavy beards and such side curls as the Russians forbade in Warsaw, and women in red wigs.

The fish market of Lwow is interesting in spite of its odor. Most of the fish are alive and in tubs, and a customer chooses his dinner according to its agility. This substitute for cold storage enables the dealers to carry over the unsold stocks from day to day, but it also saturates the place with unsold smells (see page 230).

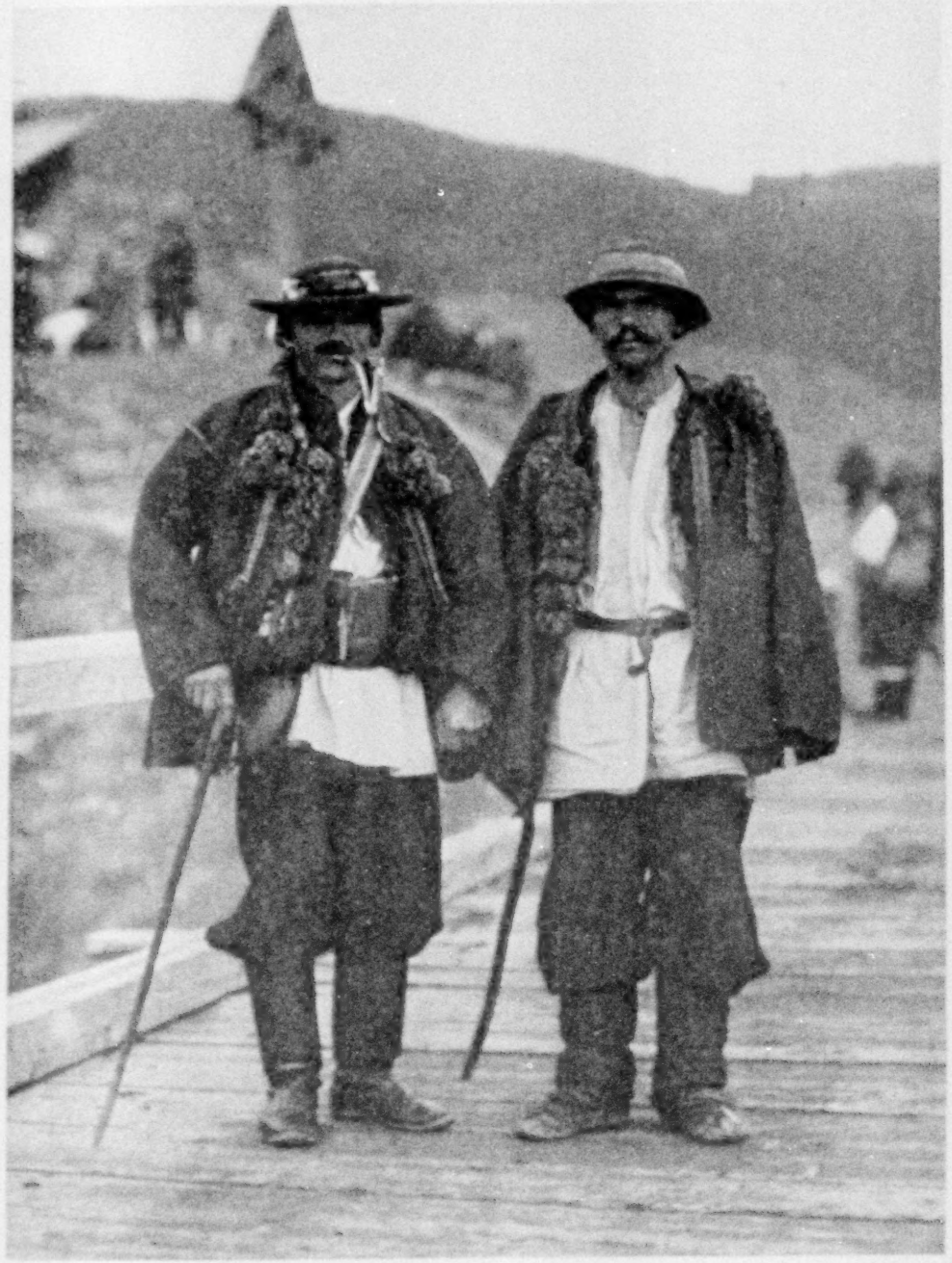
Down in the remotest and most outlandish corner of Poland lies Żabie. It is worth a trip across the republic to be there on Sunday, to see men (Huzuls) descended from free lances of several nationalities who sought refuge in the Carpathian fastnesses; men who wear belts like breastlets, studded with brass, and a costume twice as picturesque and almost as graceful as their fellow mountaineers in the Tatra.

CORNER GOSSIP

This style of pipe is much seen in the southeastern tip of the republic. Note the elaborate metal-studded pouch carried by the man at the right.

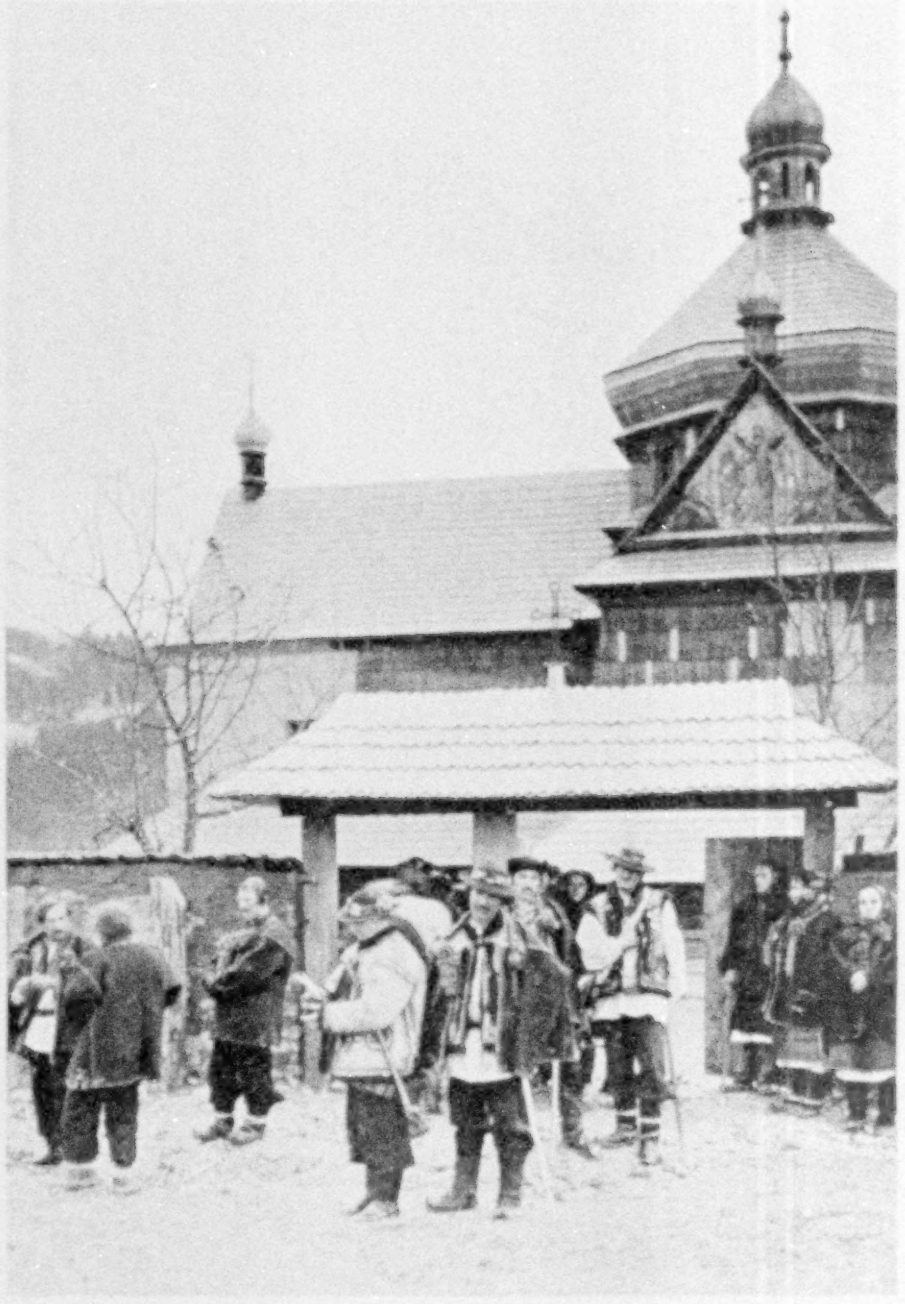
AMONG THE BARE-KNEED AMAZONS OF ŻABIE

War has left nothing of Żabie except the most extensive village in Poland. It stretches so far along the curving Czeremosz, down which the log rafts come from the heart of the Carpathians, that the price one pays to come from Kosow, 20



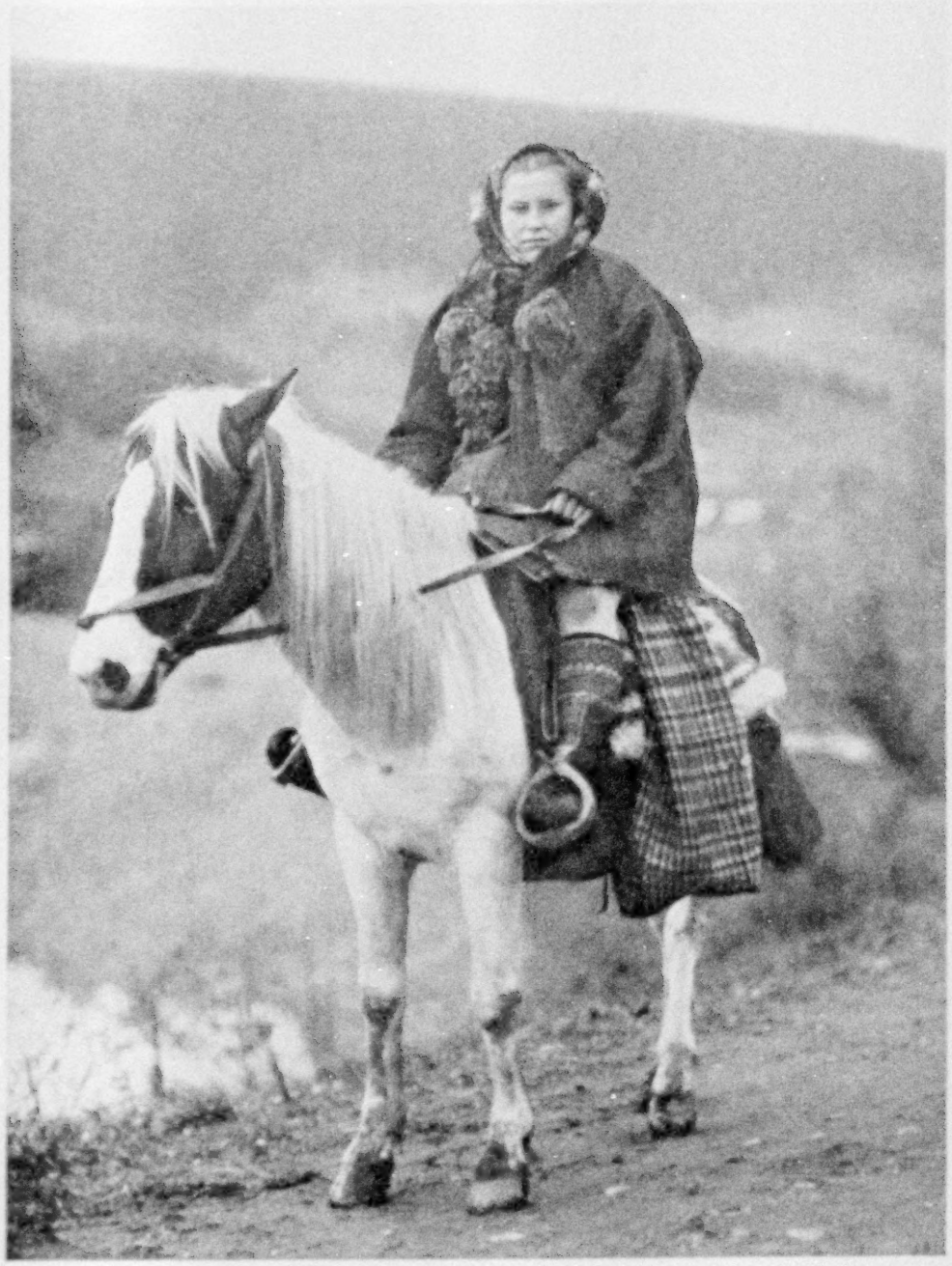
PIPE AND POM-POMS ON THE BRIDGE

For half an hour before church begins, one can see the Huzuls coming down from the hills and converging at this rude bridge. For its population, Zabie is the most extensive town in Poland, being miles long and broken up into several hamlets.



OUTSIDE THE CHURCH INCLOSURE AT ZABIE

These good folks delayed their service a little in order that the author might get these views, and out of his welter of experiences in Poland he remembers with gratitude the kindness and lack of self-consciousness and egotism among the Huzuls in this far-off corner of the republic.



A BARE-KNEED AMAZON AND A PIEBALD PONY

On the wool coat of this woman there are the pom-poms which form the chief decoration of this type of Huzul costume (see, also, illustration on opposite page).

ON THE ROAD TO ŻABIE

There is every indication that this woman is knitting; she is really watching her cows. "You can take my picture to-day," she said, "but to-morrow I shall have my nice clothes on and I will be prettier then."

© Jan Bulhak

A WINTER SCENE IN POLAND

Had the photographer been able to record on his plate a sled in the distance, pursued by a pack of ravening wolves, this scene might serve to illustrate a score of famous tales of Slavic origin.

© Jan Bulhak

A COUNTRY VILLA IN POLAND

In the United States this residence would be designated a colonial home.

miles away, varies according to what part of Żabie one wishes to visit. Were it not for the Huzuls, who come down to their church on Sundays, Żabie would not be irresistible. But with the Huzuls and the Huzulin—that is another story.

Bare-kneed Amazons ride in on pink-eyed ponies to smoke their pipes outside a church whose roof, newly shingled in spots, is as piebald as their mounts. As we drove in through a dark gorge, we came upon a group of five of them. One ranked with the handsomest women I have even seen, including the well-bred Georgian girls of the Caucasus who waited on table at the Red Cross tea rooms in Tiflis during the war. Perhaps an inch short of six feet, erect and deep bosomed, with real color in her olive cheeks and a spring in her moccasined stride.

THE PICTURESQUE IN POLAND IS FOUND

The Huzulin shares the Arab's fondness for bundling up her head. Her scarf is not only colorful, but usually in good taste. Her white blouse is plain, except for embroidery or smocking on the shoulders. Over this, in cold weather, she wears a dark coat with some bright color on the edges and seams and a row of pom-poms down the front. Some women prefer a sleeveless white sheepskin coat trimmed with brown wool and brightened by shiny appliqué work and orange or scarlet braid.

What seems to be a skirt, split to facilitate riding and climbing, is really two aprons. If either is left off, it is the front one, thus showing the knee-length white skirt of heavy linen above bare knees and red bootees, with false lacings embroidered in yellow. Rawhide moccasins and a graceful cane complete the costume.

Nowhere in Poland did I find women more free from self-consciousness and more willing, without being eager, to have their photographs taken. The day was dark, the time before the service was short, and only their good-natured cöoperation made it possible to get the pictures that justified the trip to one of the most remote corners of the republic.

On one point the women showed embarrassment. They did not want me to

A QUARTET OF ŻABIE PEASANTS WHO OVERCAME THEIR DISTRUST OF A CAMERA

These women ride well, and as one sees them striding along in their dull-red costumes, with bits of white showing cleanly amid their finery, they have real charm, in spite of the fact that in some strange way they remind one of American Indian squaws. If the face of one of these girls had been framed in furs instead of a colorful scarf, the resemblance to an Eskimo would have been marked.

take their pictures while smoking their pipes. But one woman had a sense of humor. Seeing my disappointment at not being able to record this characteristic, she borrowed a pipe from a man, stuck it between her lips, and in choicest Huzul told me to "shoot."

The pipe was as dead as Fujiyama, and I wanted a little smoke in the picture. When she tried to puff, her agonized coughing not only proved that she was not a handmaiden of Lady Nicotine, but sent the whole company into roars of laughter, in which she cheerfully—and tearfully—joined.

Then a small, toneless bell sounded and my brightly clad friends slowly filed through the shingled gateway toward their simple church. As the loose-jointed fiacre bore me along and the Huzul church merged into the cloudy notch between the Carpathians, a vivid bit of color and friendliness faded slowly away, like a candle that burns itself out.

INDEX FOR JANUARY–JUNE, 1926, VOLUME READY

Index for Volume XLIX (January–June, 1926) of the National Geographic Magazine will be mailed to members upon request.

SIENA'S PALIO, AN ITALIAN INHERITANCE FROM THE MIDDLE AGES

By Marie Louise Handley

FROM earliest morning there was a thrill in the air, as if of some portentous event about to occur. And well there might be, for Siena the classic, Siena the medieval, was about to celebrate its great annual civic festival, the Palio, a striking pageant inherited from the Middle Ages, still held in the costume of the period, and featured by the running of a strange, almost barbaric, horse race on the historic Campo.

There is no other place in the world where one may lay hand so palpably on the Middle Ages as in Siena. The architecture, the customs, the very people, have a touch of bygone days. It gives the impression of a segment of the fifteenth century passed down to modern times, with its good and evil, and, above all, with its intense local attachments, practically unchanged.

For upward of four hundred years the little Tuscan city has been organized as it is now, in *contrade*, or wards, each a distinct and separate entity, though part of the common life. Each still clings to its own individual traditions, its own loves and hates, and is ready to rally to the same flag and colors that it has cherished for centuries.

This gives to Siena a characteristic atmosphere, which more than anything, save its art, has contributed to center upon it the continued interest of the traveler.

THE PALIO A RELIC OF ANCIENT RIVALRY

As to the Palio, it is a remarkable manifestation of that keen, burning rivalry between contrade which has existed since their inception and which time and the passing of events have been unable to allay.

In seeking the origin of this strange horse race we must hail back to the zest for sport, the spirit of gallant contest, and the love for pomp and display so prevalent in the Middle Ages.

The most remote records of Siena tell of jousting and tournaments. The coming of illustrious visitors was ever the occasion for festivals of this nature, and we read that as far back as 1225 a "noble and fair tilt" took place outside of Porta Camollia.

Later, bullfights were adopted, only to be suppressed in 1590 by Ferdinand I, and races on buffalo-back seem for a time to have taken their place.

There is evidence aplenty, however, that even in early times horse-racing was a favorite pastime of the Sienese. We are told, in fact, that in 1492 a horse owned by the famous, or infamous, Cesare Borgia, won an important event, probably the predecessor of the Palio, although the chronicles mention that it was run through the streets instead of on the public square, as now.

The first Palio took place on the Campo in 1605 and has been regularly scheduled since 1651. In its present form, with all the contrade represented, and the distance established at three times around the big square, the race has been held since 1656.

STRANGE RACE PROBABLY HAD RELIGIOUS ORIGIN

It has been established almost beyond doubt that the Palio was introduced to celebrate a religious anniversary, the feast of Santa Maria Assunta, whose image is depicted on the banner bestowed upon the winner.

At one time Siena's 17 contrade all participated in the Palio, each entering one horse, but, owing to the frequency of serious accidents, experienced through the overcrowding of the narrow track, the number of contestants is now limited to ten. Seven of the contrade are privileged and run by "right," as they express it, while the three others are drawn by lot.

The horsemen ride bareback, in the Palio, armed with a punishing whip, the *nerbo*, made of twisted, hardened ox sinew and measuring about three feet.

This whip plays an important rôle. In the olden days a long, flexible one was used, and the competitors were allowed to wield it so as to entangle their opponents and throw them; but this practice is now forbidden.

Photograph by Emil P. Albrecht

CLEARING THE TRACK FOR THE PALIO

Before the starting hour of the race a line of well-mounted, handsomely uniformed local constabulary forms across the track and gradually pushes the excited crowd back into the seats built around the piazza or into the circle of standing room corresponding to a paddock.

Photograph by Emil P. Albrecht

CROWDS LINING THE COURSE OF THE PALIO AT A CORNER OF THE PIAZZA DEL CAMPO

The sharp curves and irregular surface make this race course one of the most difficult in the world, but it supplies in picturesque setting what it lacks in other respects. At some of the more dangerous turns, bulwarks of mattresses are built up to prevent serious injury in the frequent "spills" that occur.

The good Sienese, however, anxious to preserve the joustlike character of the race, have decreed that their champions may belabor one another with the heavy nerbo whenever the chance presents. To prevent fatal injury, the men are permitted to wear metal helmets; but, even so, the flaying weapons sometimes inflict wounds the marks of which are carried for weeks.

A SAVAGE, FANTASTIC RACE

No sooner does the starting gun sound than the excited jockeys begin to ply their whips, and the resultant spectacle may be imagined: Ten high-strung, fear-crazed horses racing furiously around the hard, slippery, stone-paved course; ten riders recklessly urging their mounts to greater speed and raining vicious blows at each other the while. It is thrilling, savage, fantastic.

Three days before the meet, some 20 horses, voluntarily contributed by private individuals, are brought together and tried out. The ten most evenly matched are selected, and on the eve of the race the ward captains gather at the Palazzo and draw lots for them.

The allotment is made immediately after, and the riders at once take possession, adjourning to the Campo for a practice gallop. There the excitement commences. The horses, strange to the noisy, crowded surroundings, invariably become restive and unmanageable, rearing, backing, kicking, bolting, and causing general pandemonium. Gradually, however, men

and mounts grow better acquainted, and eventually they come to a mutual understanding.

At last the great day dawns and the imperative summons of a sonorous bell tells us it is time to be stirring. The hour is only five, but the city is already in turmoil, as we sally forth under the cloudless sky of an August morning.

The streets are packed from wall to wall, and following the streaming populace, we are led to the votive chapel on the Piazza, a shrine erected in thanksgiving for deliverance from the plague of 1348.

Mass is being celebrated and the little church is crowded with men, only a few women hanging about the outskirts. Over the heads of the worshipers we can see the ten riders, in full colors, kneeling shoulder to shoulder in front of the altar, the bitter rivalry of faction held in check during this brief interval of prayer.

Then the ceremony is over and we are again in the streets, now alive with the subdued roar of mustering thousands. Every familiar language mingles in the general babble; most of the civilized nations seem to be represented in the throng about us; yet on every lip, native or foreign, is but one topic—the Palio.

WE CHOOSE A CHAMPION

We had set out with mild, amused curiosity; but it was impossible to resist the galvanic touch of the throbbing interest on all sides. And presently we were asking ourselves to what quarter of town we belonged; which horse was ours; who was to ride for us; what his colors were? These matters had unexpectedly become of vital importance.

Obviously, it was to the quarter in which we had taken lodgings that we owed allegiance, and we posted ourselves without delay. It proved to be the Contrada dell' Oca, its emblem a goose, and we went at once in search of our favorite.

A few coppers induced a passing lad to conduct us to the place where the horse was stabled, and we caught sight, behind a wire netting, of a glossy, clean-limbed bay, with long, smooth running gear, a fine, intelligent head, and apparently in the pink of condition. We felt elated.

Meanwhile our young escort had informed us that the racers were shortly to be blessed by the priest, the ceremony to take place in churches of the respective wards; so we sauntered over to the Oratory of Santa Caterina, where our champion would be taken.

It was not long before the chaplain came from the sacristy, book in hand, surplice and stole over his cassock, and the altar tapers were then lighted. Almost immediately a commotion in the crowd announced the approach of the horse, and the priest urgently pleaded for silence, that the nervous animal might not be frightened.

In the perfect stillness that followed we heard the stamp of hoofs on the pavement, then at the threshold, and the beautiful creature was led up the aisle to the altar steps by the rider himself. The noble beast stood motionless, while the Latin benediction was read, then holy water was sprinkled over his proud head, and the ceremony was over.

But the picture remains with me to this day—strange, extraordinary, even weird. I can still see the shadowy altar starred with lights, the shining coat of the gallant racer, and the man, magnificent in his parade dress of green velvet slashed with white satin, vermilion undersleeves and vest, feathered cap crushed in hand—a striking group, like a scrap of the past enacted before us in some magic way.

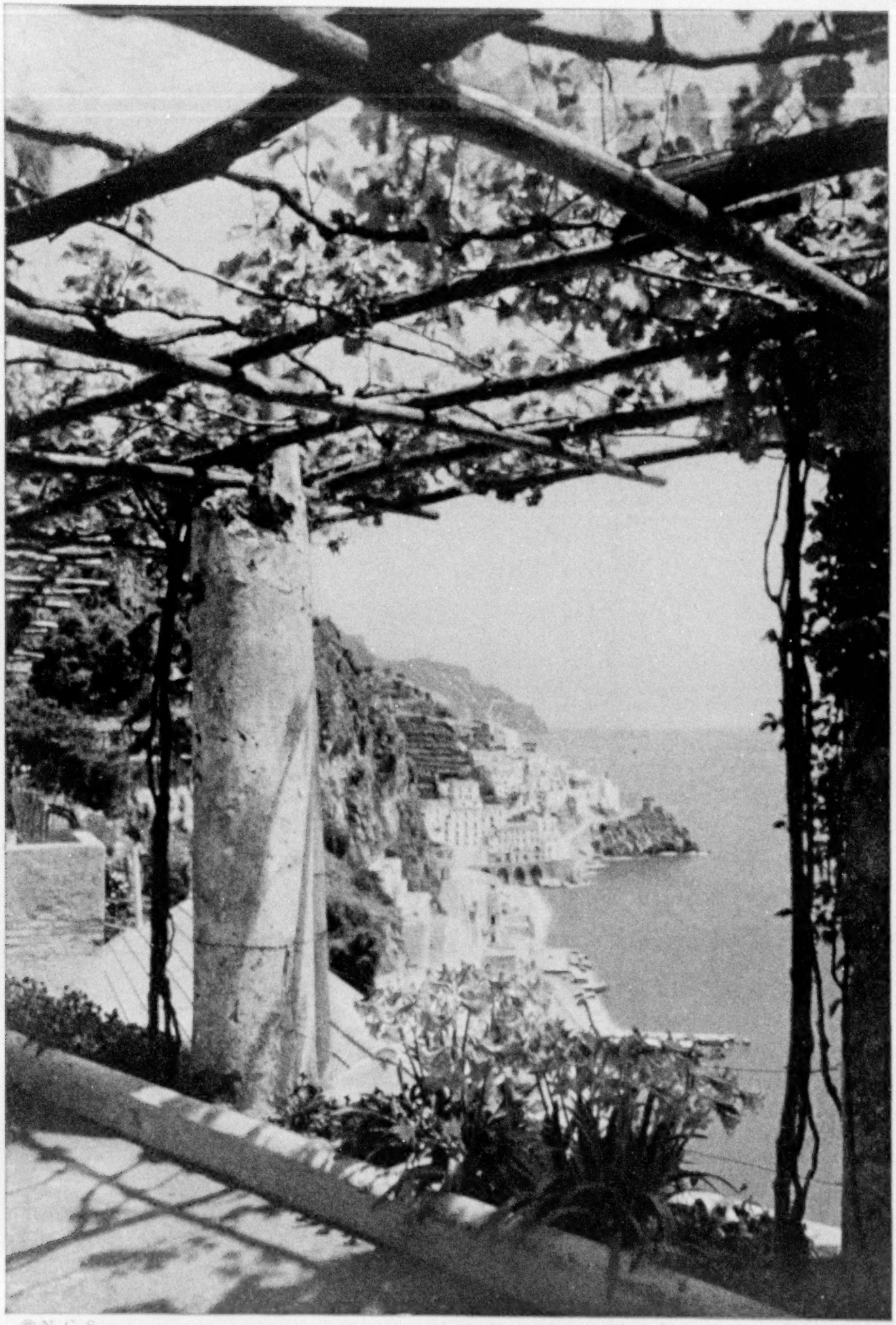
PARADERS WEAR SIXTEENTH-CENTURY COSTUMES

It was now time for the procession of the delegations from the various contrade. It has been the usage ever since the sixteenth century for these contrade to appear in full regalia on all momentous occasions. Each still disports the gorgeous costumes of the period and bears the ward banner, blazoned with the device originally adopted, such as the Lion, the Caterpillar, the Goose, the Ram, etc., which give to the various districts the names by which they are known. The procession, of course, has remained an important feature of the Palio.

We repaired to the Campo to watch the parade, and it proved an imposing sight.

Each contrada formed a separate group, preceded by a drum major, who set the pace and signaled the stops and advances, as required.

Behind him marched two ensign-bearers,



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Autochrome by Hans Hildenbrand

AMALFI CLIMBS TO THE HEIGHTS FROM THE BLUE WATERS OF SALERNO'S GULF

Lying along a ravine, at the foot of a mountain, this noted area of Italy's Campania attracts throngs of visitors, who are enraptured by its sheer beauty. Such a view as this inspired Longfellow's lines to the enchanting city "bathing ever her white feet in the tideless summer sea" (see also Color Plate VI).

© N. G. S.

Autochrome by Hans Hildenbrand

FROWNING RIVA SMILES AGAIN

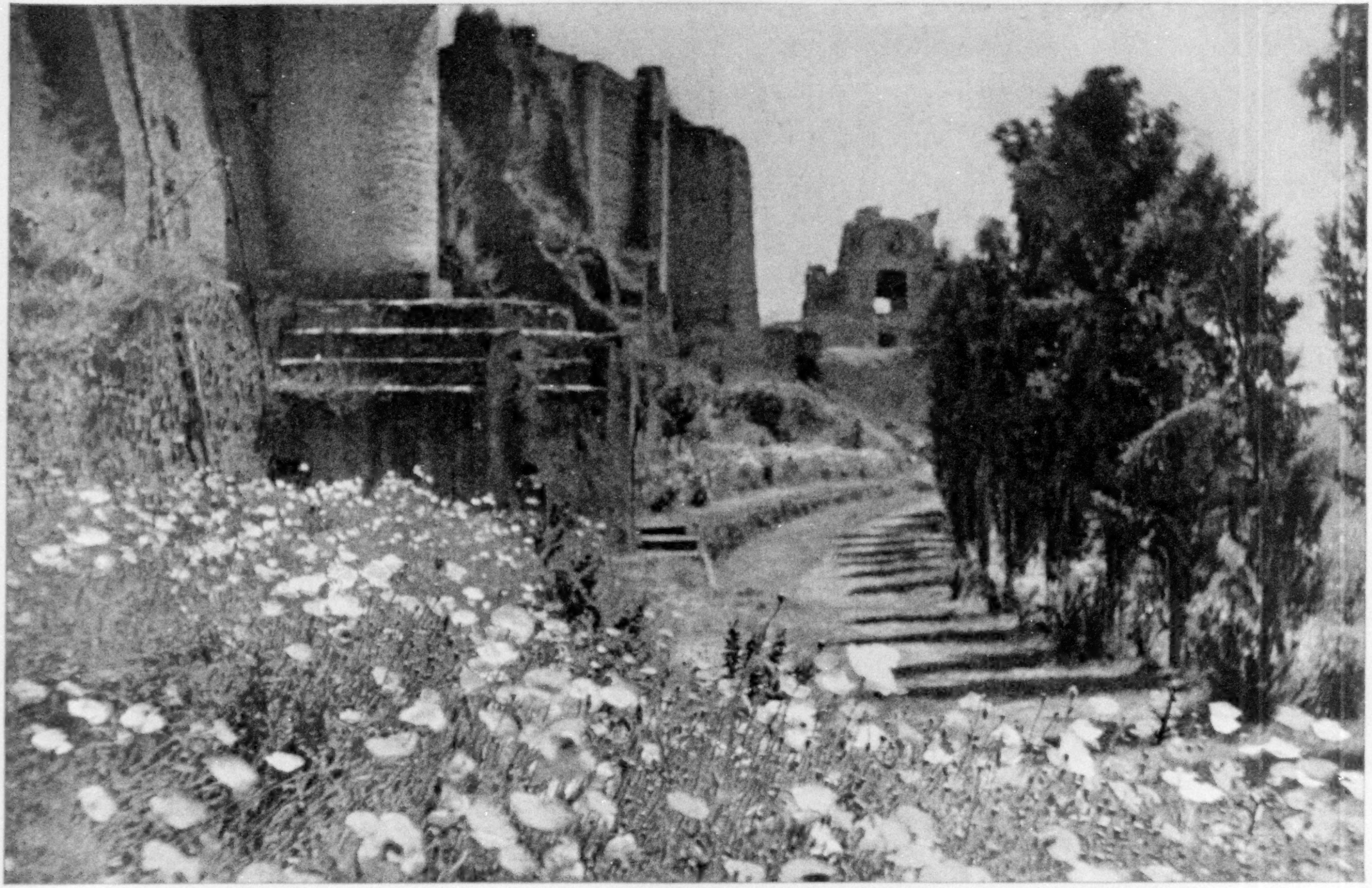
Once Riva, at the head of Lake Garda, was a heavily fortified Austrian border town, with galleries along the overhanging cliffs bristling with guns. To-day it is Italian. The corniche road which winds along the cliff face above the town darts in and out of these galleries from time to time.

© N. G. S.

Autochrome by Hans Hildenbrand

PEACETIMES ALONG THE ITALIAN RIVIERA

The luxurious vegetation, golden sunshine, and mild climate which characterize this region have made Bordighera popular as a winter resort. Many of its gorgeous blooms and young palm trees are exported.



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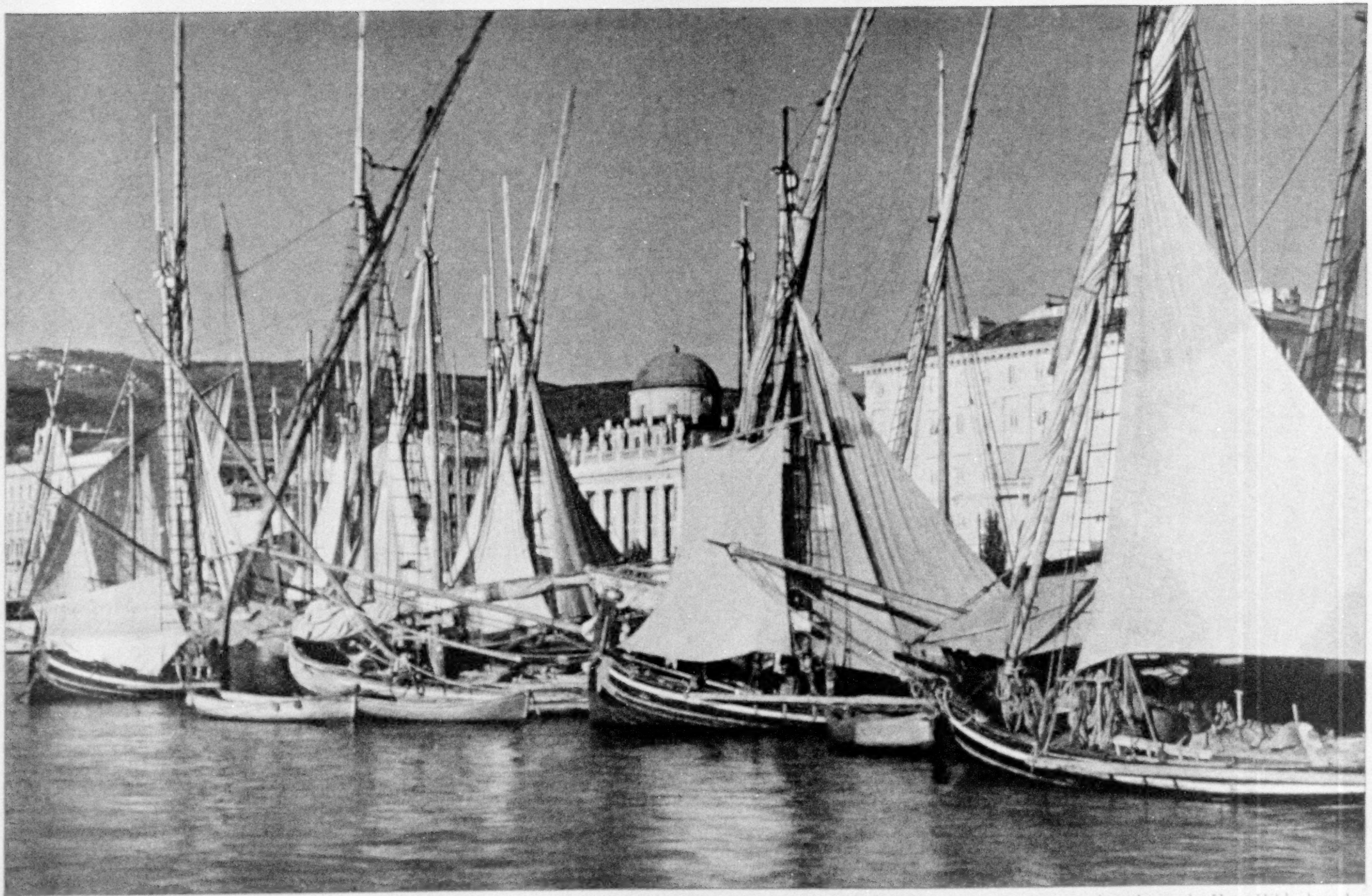
Autochrome Lumière by Luigi Pellerano

POSTHUMOUS FLOWERS FOR THE CAESARS

Rome, once Mistress of the World, had her cradle on the Palatine Hill, on which this hoary remnant of regal splendor stands, and here poppies raise flaming heads among the ruins of sumptuous palaces built by wearers of the purple.



Autochrome by Hans Hildenbrand

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MULTIHUED SAILS BRIGHTEN THE FISHING BOATS IN TRIESTE'S HARBOR

The architecture of Italy's newly acquired port tells its history. The wide banks along the waterfront are lined with palacelike buildings constructed by the Austrians, while in the background rises a Greek church to care for the spiritual needs of the large Slavic population which has lived in Trieste under Austrian and Italian rule alike.

© N. G. S.

Autochrome by Hans Hildenbrand

AN EARLY RIVAL OF PISA AND GENOA

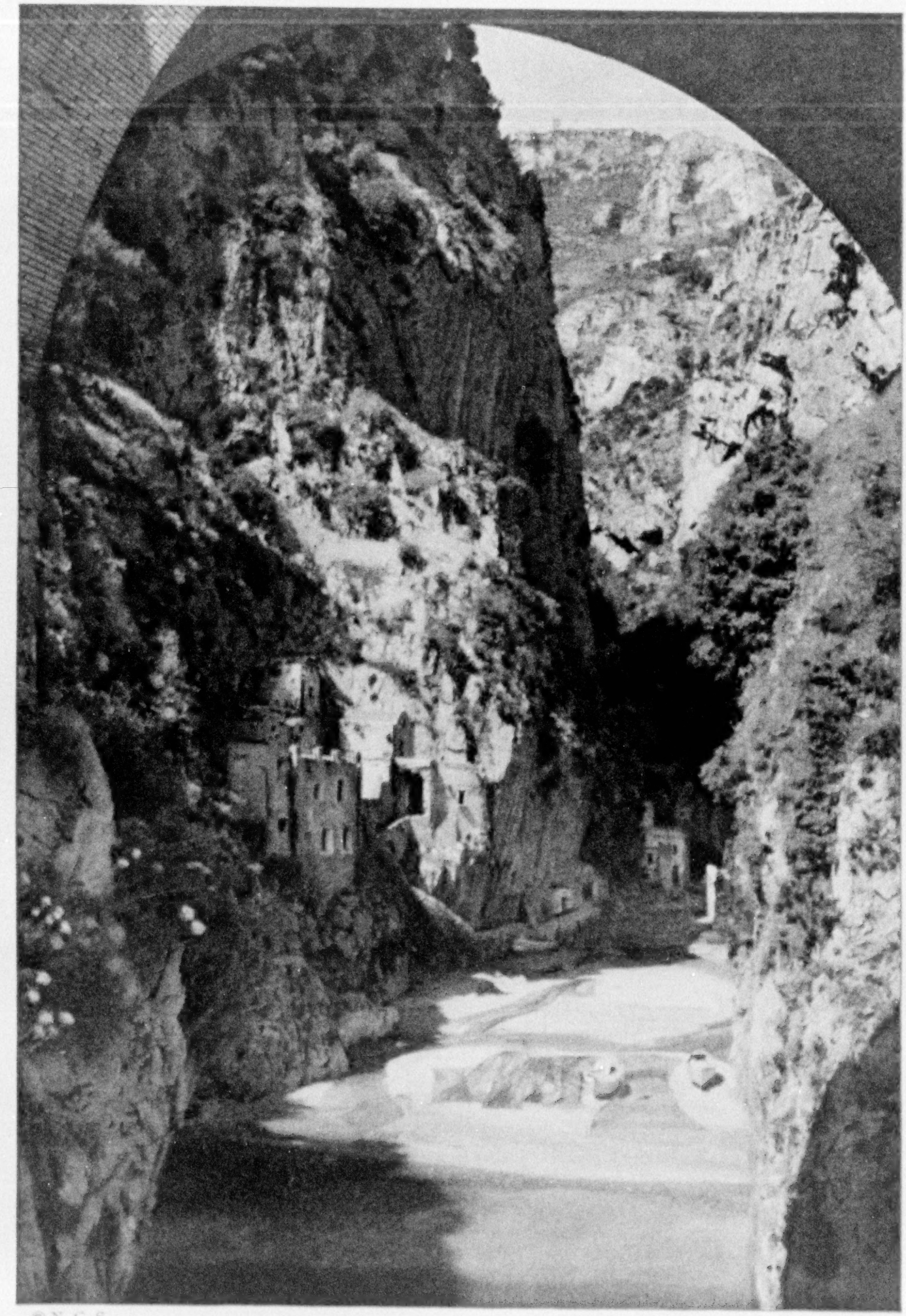
Although long since fallen from its high estate as a seaport, Amalfi looks back upon the time when its maritime code was recognized in Mediterranean waters and when it shared with Venice and Gaeta Europe's water-borne trade with the East. The ancient city of "the freighted barks" of commerce, however, now lies beneath the sea.

© N. G. S.

Autochrome by Hans Hildenbrand

A QUIET HAVEN ON LAKE GARDA

The little village of Torbole, near Riva (see Color Plate II), was once the scene of the climax of a stupendous feat performed by the Venetians during their war with the Visconti in 1439. To regain control of the lake they hauled twenty-five boats and six galleys over mountain trails and passes in fifteen days and launched the fleet on its waters. Goethe wrote part of the "Iphigenie" in an inn overlooking the lake.



© N. G. S.

Autochrome by Hans Hildenbrand

REMINDERS OF AN ANCIENT PAST

These Saracen habitations clinging to the rugged mountainsides near Amalfi hark back to the days of turmoil when southern Italy was the fighting ground of Greeks, Saracens, Lombards, and other adventurers with spoils as their only goal.

whose flag-play proved one of the most attractive features of the parade. The contrade would each pause in turn, as they passed the dwellings of the city authorities and the palaces of the nobles, that honor might be shown the inmates with a skilled display of ensign-waving (see page 258).

Following the ensign-bearers came the captain of the quarter, encased in full armor and surrounded by four youths, two burdened with his weapons of war, the other two carrying halberds and acting as escorts.

Next marched a page in gorgeous raiment, bearing the ward standard, a great banner of silk and velvet, heavily embroidered in gold and blazoned with the armorials of the district.

Then came a palfrenier, leading the contrada racer, handsomely caparisoned and plumed, followed by the chosen rider mounted on a charger and attired in the garb of his fellow wardmen.

The ten contrade having candidates for the Palio headed the procession; then, sandwiched in between them and the others, strode the Chief Magistrate of Siena, supreme arbiter of all factional strife, and the city officers.

Rolling in the rear of the last contrada was the war chariot of olden days—ugly, cumbersome, and dilapidated, but gaily decorated with flags and shields and drawn by four great horses.

A squad of men at arms trailed the old war chariot and closed the procession. The last row of them had barely left the Campo when a great beating of drums announced that the mounted riders had come through the portals of the Podestà, and every neck was craned to get a glimpse of the prancing horses as they went to the barrier.

A TENSE SILENCE AWAITS THE START

There was silence now on the big square, a silence of vibrant anticipation. With quickening pulse, every man and woman waited the sharp crack of the pistol, which was to release the eager horses fretting behind the barrier.

It came suddenly, almost unexpectedly, and the blood leaped into action at the sight which followed.

In serried ranks the racers sprang forward, moving at terrific pace, their riders sitting as if a part of them—knees tight, bodies swaying nimbly, arms waving the wicked whips and administering great blows right and left.

Sparks and sand flew from the horses' hoofs; the crowd leaned forward without a sound, thrilled and expectant. Then, abruptly, a cry of alarm broke the silence. At the sharp turn by S. Martino, where the course slopes suddenly, a man had been flung to the pavement, his horse stumbling and rolling over. I closed my eyes as the others pounded by the huddled figure, for it seemed impossible that the flying hoofs could avoid it.

A sigh of relief told me that by some miracle the rider had escaped, and I looked again, to see him struggle to his feet and stagger slowly toward the paling.

It was none too soon; the racing centaurs were flashing by him once more.

Harder and harder the pelting horses strove, as the last lap was entered. But now the crowd had come to life and hurled frenzied yells of encouragement or bloodcurdling threats and curses at the riders. Oca, our own contrada entry, was leading, neck to neck with the Montone entry, and, thrilled to the marrow, I forgot all decorum and added my voice to the shouting chorus, carried away by the electrifying enthusiasm all around.

OCA WINS IN THE HOME STRETCH

Montone pressed forward at the turn, and a fierce execration broke from the Ocaioli, to be followed immediately by a cry of joy; for Morello, our hope, responded valiantly to the challenge and again drew abreast of his rival.

Nose to nose they thundered toward the stretch—now one, now the other a few inches ahead; then, on straightening out, Montone made his last bid, and I grew suddenly cold, for his head soon showed clear.

But it was the dying effort of the game creature. Ten lengths from the post Morello began to creep up, eye aflame, nostrils quivering. For a moment he hung beside the rocking Montone; then with a wonderful leap he sprang forward and floundered across the line a winner!

A roar of mingled triumph and bitter disappointment shook the air. People swarmed over the course, even before the last horse had finished, and Mellini, the rider, was unceremoniously pulled off his

Photograph by Emil P. Albrecht

A MASTERFUL DISPLAY OF A UNIQUE ART

Two ensign-bearers for each ward execute intricate and beautiful maneuvers with their great silk banners as they parade around the course. By a peculiar sort of rotary motion they keep the flags fully extended, go through all kinds of graceful gyrations with them, and at intervals fling them aloft, catching them as they fall.

mount and surrounded by the police, who thrust back friend and foe without distinction. Factional feeling runs so high at this hour of pandemonium that more than once a knife stab has been the reward of the winning jockey.

Hurriedly the man was led before the judges to receive their congratulations. Then, while the delirious crowd surged about the war chariot with lusty cries of "Palio! Palio!" and seized the coveted banner to carry it in triumph through the streets, the hero of the day was hustled quietly to the Palazzo della Republica, there to spend the night under lock and key, beyond reach of knife and stiletto.

There was little sleep in our neighborhood until morning. The cheer of the Ocaioli, a thrice-repeated cry of *"Papero"!* (Gander!) sounded continuously, and chorus upon chorus passed under our windows, singing the song of the quarter:

"This is the song of the Red and White, the song of the Green 'tis, too; whether you will or whether you won't, you must respect the song we sing; bells shall peal and trumpets ring; bold of bill and strong of wing, hurrah for the Gosling true!"

Ideal for luncheon or supper!

In summer when you serve so many cold foods and beverages, don't overlook the fact that a hot dish, with the meal or as a meal, acts as a healthful stimulant and aids digestion.

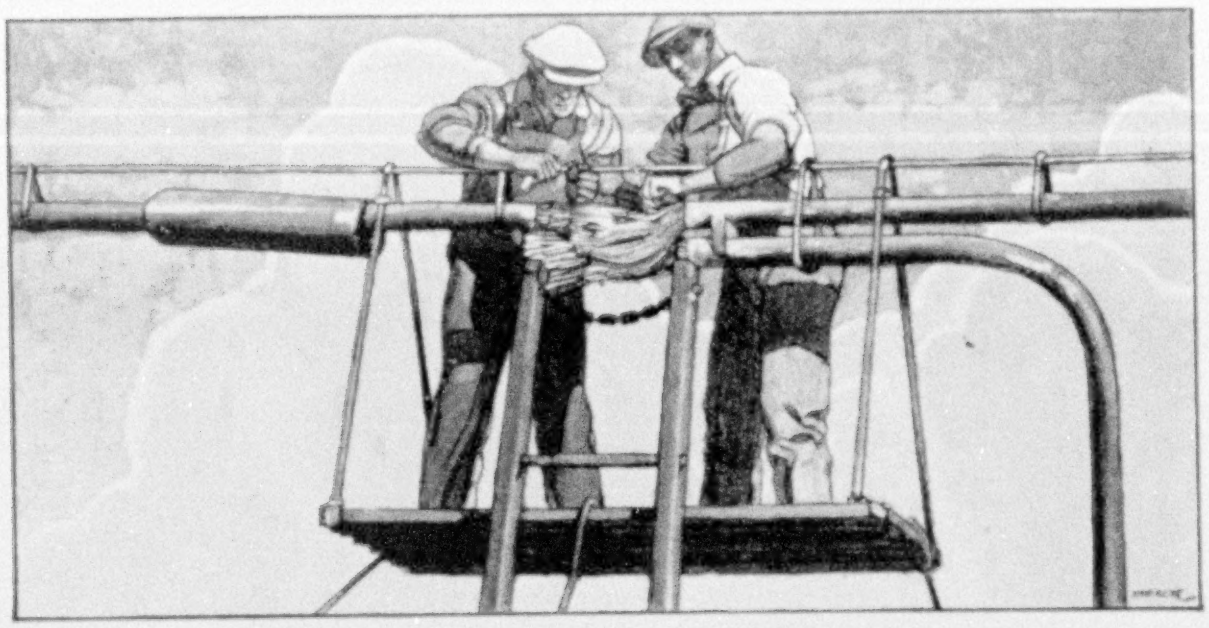
Tempting, nourishing, hearty soup makes a wonderful luncheon or supper these days.

In Campbell's Vegetable Soup there is the ideal combination of foods—fifteen fine garden vegetables, invigorating beef broth, substantial cereals, appetizing herbs and seasoning.

With the meal or as a meal soup belongs in the daily diet!

LOOK FOR THE RED-AND-WHITE LABEL

Joining the wires in a great trunk nerve between New York and Chicago



The Nerves of a Nation

THE magnitude of our present system of telephone communication was beyond the thoughts of men fifty years ago. While at that time Bell, the inventor, had a prophetic vision of places and houses and factories connected by telephone, even he could not have foreseen the American city of skyscrapers with more telephones in one building than are to be found in many a foreign country.

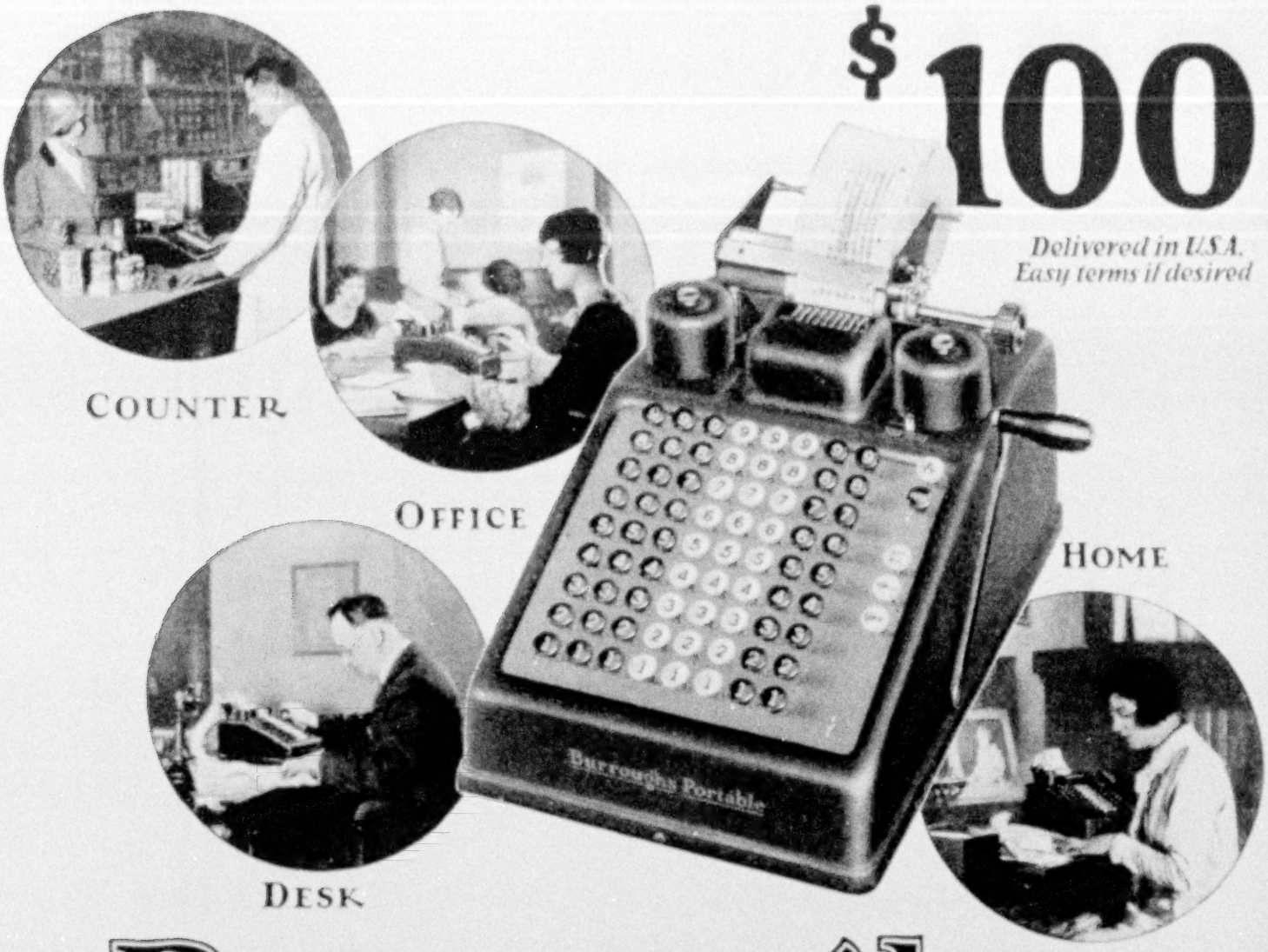
The massed multitudes of the modern city can no longer be served by wires strung in the air. We now have telephone cables no bigger than a man's wrist, each containing 2400 thread-like wires, carrying beneath the city streets their millions of spoken messages. Long distance cables overhead and underground connect cities with one another by storm-proof conductors, now being extended into a country-wide network.

At the present time nine-tenths of the 45,000,000 miles of telephone wire in the Bell System are in cable. The service of each telephone user has become more and more reliable with the extension of this cable construction.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES

BELL SYSTEM

IN ITS SEMI-CENTENNIAL YEAR THE BELL SYSTEM LOOKS FORWARD TO CONTINUED PROGRESS IN TELEPHONE COMMUNICATION



$100

Delivered in U.S.A.
Easy terms if desired

Burroughs

Portable Adding Machine

In this new Burroughs, portability and low price are combined with Burroughs quality, dependability and accuracy.

Big business is using this machine on individual desks in various departments.

The small retailer is using it on his counter and in his office.

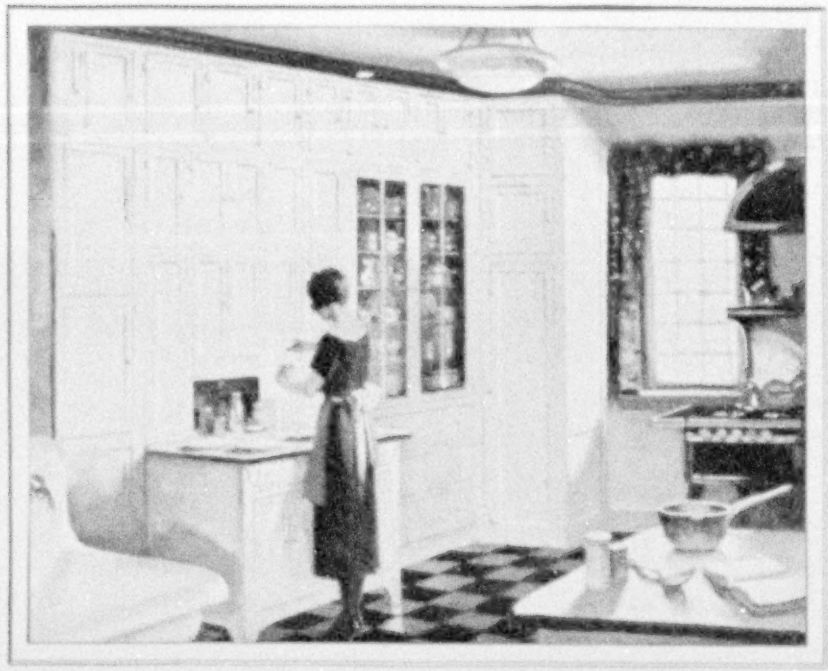
Professional men, secretaries of organizations and others find it indispensable in their offices and homes for business and personal accounts.

The Burroughs Portable adds up to $1,000,000.00; has standard visible keyboard and one-hand control. It prints ciphers and punctuation automatically. It requires little more space than a letterhead.

The price is only $100—$10 down, with balance in convenient monthly payments.

BURROUGHS ADDING MACHINE COMPANY
6387 SECOND BLVD. DETROIT, MICHIGAN

BACKED BY BURROUGHS SERVICE



Shaped in Steel

This Modern Kitchen does Save Steps

Sheet Steel has simplified housework.

Cupboards of Sheet Steel provide a place for everything from salts and spices to mops and electric cleaners.

Right at your finger tips, too . . . without a wasted inch.

And Sheet Steel table tops in glistening porcelain enamel are easily kept clean. So are pots, pans, kettles, stoves, and cabinets that modern hygiene insists must be spotless.

Sheet Steel furniture reduces polishing and cleaning to a moment's work. The finish baked on at high heat resists the action of smoke, dust, spilled perfumes . . . even lighted cigarette stubs burn themselves out without a trace.

Everywhere you will find equipment of Sheet Steel saving time and effort . . . lowering costs . . . making life more worth living. Sheet Steel has become standard for business, for factories, for hotels and institutions.

Now homes and farms are insisting on products made of this better material—heating systems, garages, wall linings, sanitary systems, etc.

You will be interested in reading further details in the interesting booklet, THE SERVICE OF SHEET STEEL TO THE PUBLIC, mailed on request to the SHEET STEEL TRADE EXTENSION COMMITTEE, OLIVER BUILDING, PITTSBURGH, PENN.

MASTER TEC BRAND

This trade-mark stenciled on galvanized Sheet Steel is definite insurance to the buyer that every sheet so branded is of prime quality—full weight for the gauge stamped on the sheet—never less than 28 gauge—and that the galvanizing is of the full weight and quality established by the Sheet Steel Trade Extension Committee specification.

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FOR SERVICE

Supreme Performance Sensational Values

The Famous Chrysler "70"

Model	New Price	Savings
Coach	$1395	$ 50
Roadster	1525	100
Royal Coupe	1695	100
Brougham	1745	120
Sedan	1545	150
Royal Sedan	1795	200
Crown Sedan	1895	200

All prices f. o. b. Detroit, subject to current Federal excise tax.

All models equipped with full balloon tires.

Ask about Chrysler's attractive time-payment plan. More than 4300 Chrysler dealers assure superior Chrysler service everywhere.

All Chrysler models are protected against theft by the Fedco patented car numbering system, pioneered by Chrysler, which cannot be counterfeited and cannot be altered or removed without conclusive evidence of tampering.

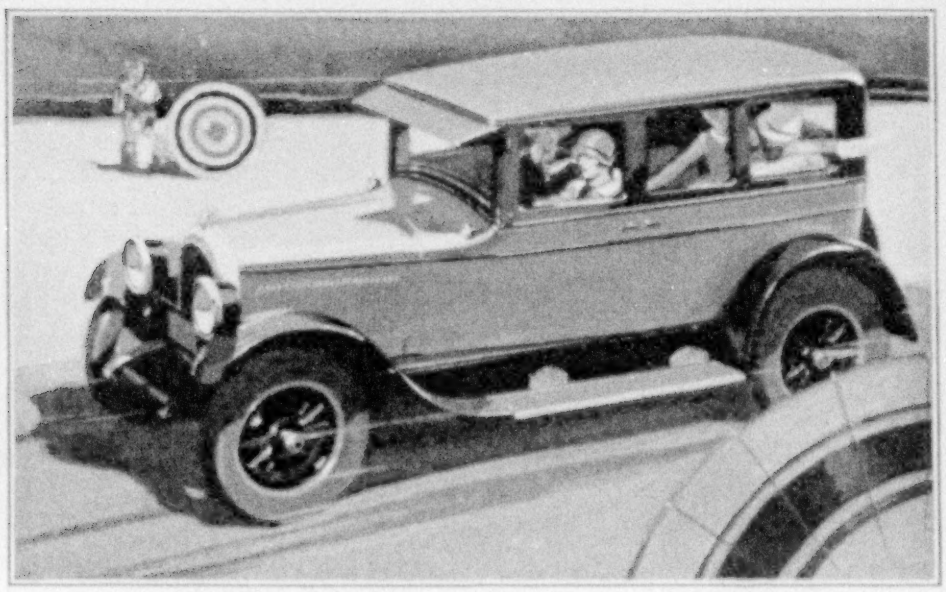
Chrysler "70" Reduced $50 to $200 Unchanged except in Price.

Today's Chrysler "70"—changed in no way except new lower prices—is more than ever the car of world-wide preference.

Long lived; characteristic Chrysler beauty; designed to meet today's traffic needs; roomy for comfort and luxury; easiest to handle; flashing pick-up; 70 miles plus; safe—little wonder that none of its more than a hundred thousand owners who have enjoyed uninterrupted satisfaction and pleasure from their Chrysler 70's for thousands upon thousands of miles, will ever willingly go back to the less modern type of cars.

And now with its savings of $50 to $200, Chrysler "70" is beyond all doubt the preferred motor car investment at these lower prices in its class.

CHRYSLER SALES CORPORATION, DETROIT, MICH.
Chrysler Corporation of Canada, Limited, Windsor, Ontario



CHRYSLER "70"

Sedan $895—Special Sedan $995
f. o. b. Detroit

Supremacy in Fine Steel

In the percentage of Costly Chrome Vanadium Steel used, Dodge Brothers Motor Car outranks any other automobile in the World, regardless of cost.

It is everywhere conceded that Chrome Vanadium Steel is the toughest and most enduring metal ever created for use in the vital parts of a motor car.

It may not be so well known, however, that Dodge Brothers Motor Car ranks *first in the world* in the use of this costly and fatigue-proof material.

Dodge Brothers power assembly is almost entirely Chrome Vanadium—motor, connecting rods, crankshaft, transmission, universal joint, drive shaft, differential and rear axle.

Even the front axle is Chrome Vanadium—the entire steering unit—and *every* leaf of the springs.

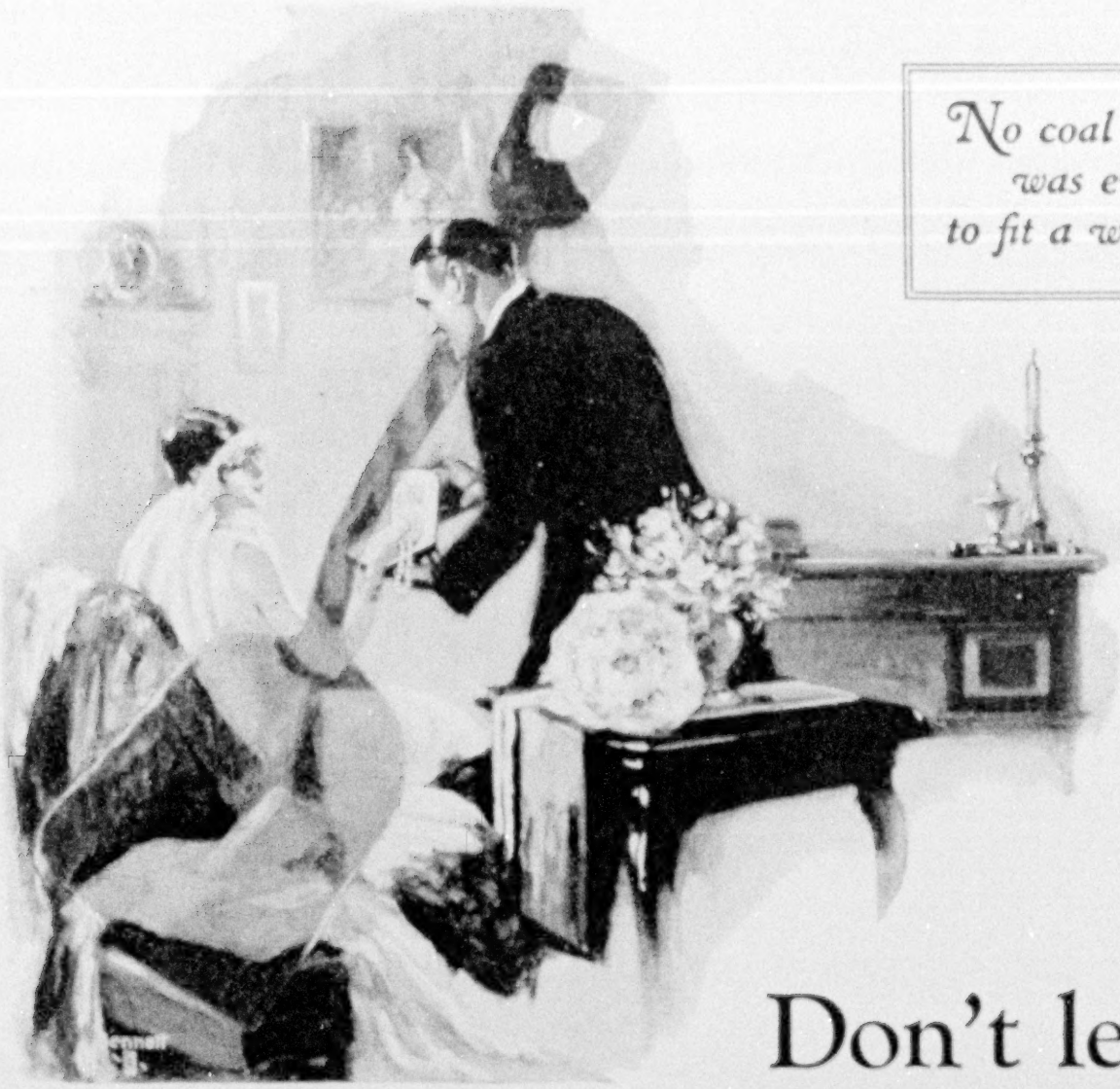
In fact, wherever *any* manufacturer uses alloy steels, Dodge Brothers use costly Chrome Vanadium. And in numerous instances Dodge Brothers employ it where plain carbon steel, even in the costliest cars, is commonly thought sufficient.

This has been true from the day Dodge Brothers built their first motor car.

This explains why the words *Long Life, Safety* and *Dependability* are habitually associated with the name Dodge Brothers wherever motor cars are serving mankind.

DODGE BROTHERS INC DETROIT
DODGE BROTHERS (CANADA) LIMITED
TORONTO, ONTARIO

DODGE BROTHERS
MOTOR CARS



No coal shovel was ever made to fit a woman's hand

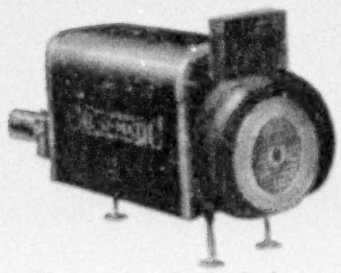
Don't let the shadow of the coal shovel ever come between you

PRETTY gifts do not take the place of modern conveniences. Only by relief from the irksome tasks about the house can any wife enjoy the leisure so necessary to loveliness and charm.

With Oil-O-Matic you provide a form of heat as carefree as the light that floods the room. Where most modern household devices are at best only labor *saving*, Oil-O-Matic *eliminates* work! It automatically maintains an even temperature.

Curtains appear freshly laundered throughout the heating season. Delicately tinted walls remain so, even back of pictures. Dusting is necessary only half as often. Rugs and carpets need much less attention of the vacuum cleaner. Good maids do not leave such homes.

Each morning you wake in luxurious comfort. All day, and as far into the night as you wish, the same balminess is maintained. In the early fall, and late spring, you never lack for heat.



No part inside the firebox

Any moment heat is desired, you have it before you realize that you need it.

You can have this comfort for practically the same amount that you are now spending to heat your house *without complete automatic service!*

The oilomatician in your community is a graduate of the Williams Institute of Heat Research. Trained in all phases of oil heating. He offers convenient terms to those who prefer to extend their payments over a year. Let him examine your heating plant *now*, when installations can be made most easily.

Send the coupon below for a copy of "Heating Homes With Oil." It tells you everything you want to know about this modern way of heating. It is sent free and postpaid, with plan for ideal arrangement of basement space.

WILLIAMS
OIL-O-MATIC
HEATING

World's Largest Producer of Automatic Oil Burners

Williams Oil-O-Matic Heating Corp.
Bloomington, Ill. NG—8-6

Please send me without obligation a copy of "Heating Homes With Oil," with plan for ideal basement.

Name .....

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Moderate rates on a luxury ship—

GEORGE WASHINGTON

STAND DOWN at the Battery some day and watch the George Washington coming up the Bay. Three thousand miles of Atlantic behind her and looking as if she had just been launched. Nearly 24,000 gross tons and moving like a yacht.

People who sail on this ship to Europe again and again are mostly those who like to travel fast without ever seeming to, who like refined not gaudy surroundings, and those who are critical of cookery and too experienced to take chances when it comes to long distance travel.

On the George Washington, smoothly running elevators supplement beautiful stairways. Wherever possible, Colonial windows replace portholes. There are promenade decks, smoking rooms, lounges, barber shops and a gymnasium.

Rates are most reasonable. First class from $210; second from $136.25 and Tourist Third from $97.50.

Under the Stars and Stripes

Besides the George Washington, the United States Lines operate the Leviathan, most famous ship in the world, the America, largest of all Cabin liners, the Republic, the famous cruise ship, the President Harding and President Roosevelt, the fastest Cabin ships on the Atlantic.

* * *

Regular sailings from New York to Cobh (Queenstown), Plymouth, Cherbourg, Southampton and Bremen. Ask your local steamship agent for complete information or write to 45 Broadway, New York City.

United States Lines

Operating the LEVIATHAN, GEORGE WASHINGTON, PRESIDENT ROOSEVELT, PRESIDENT HARDING, REPUBLIC and AMERICA to Europe.

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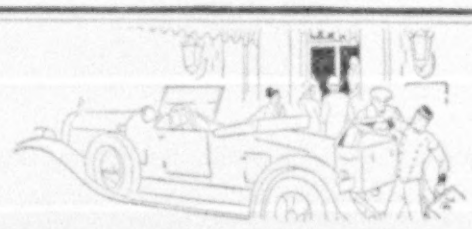

The Friendly Road and the Friendly Haven

Touring, or just plain traveling, wouldn't be half so pleasant if there were not a restful hostelry at the end of the day's journey. A tiled bathroom, palatable food, a luxurious box-spring mattress—what a difference these comforts make after a hard day!

Make sure of them by stopping at United Hotels on your next trip. Each of these splendid establishments specializes in friendly hospitality. No requirement of a guest is too trivial for quick and courteous attention. No facility for a guest's comfort is ever overlooked.

The BANCROFT	Worcester
*The BENJAMIN FRANKLIN	Philadelphia
The DURANT	Flint
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The PORTAGE	Akron
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The ROCHESTER	Rochester
The ROOSEVELT	New York
The SENECA	Rochester
The STACY-TRENT	Trenton
The TEN EYCK	Albany
The UTICA	Utica
The CLIFTON	Niagara Falls, Canada
KING EDWARD	Toronto, Canada
The MOUNT ROYAL	Montreal, Canada
PRINCE EDWARD	Windsor, Canada
ROYAL CONNAUGHT	Hamilton, Canada
The ADMIRAL BEATTY	St. John, N. B.
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*Your headquarters during the Sesquicentennial

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European headquarters, United Hotels Travel Bureau, 7 St. James's Street, London, S. W. 1, England; 6 Rue Caumartin, Paris, France.

He detects the slightest trouble

If you go to your dentist at least every six months for a thorough inspection of your mouth he can prevent serious teeth decay and detect the first trace of dangerous gum infections. It is better to see him in time than to suffer needless pain and take chances with your health.

Pyorrhea robs 4 out of 5

According to dental statistics, carelessness lets dread pyorrhea steal into the mouths of four out of five men and women after forty and pirate precious teeth and health. You can tell pyorrhea's approach by tender, bleeding gums. Go to your dentist at once for treatment and be sure to use Forhan's for the Gums night and morning.

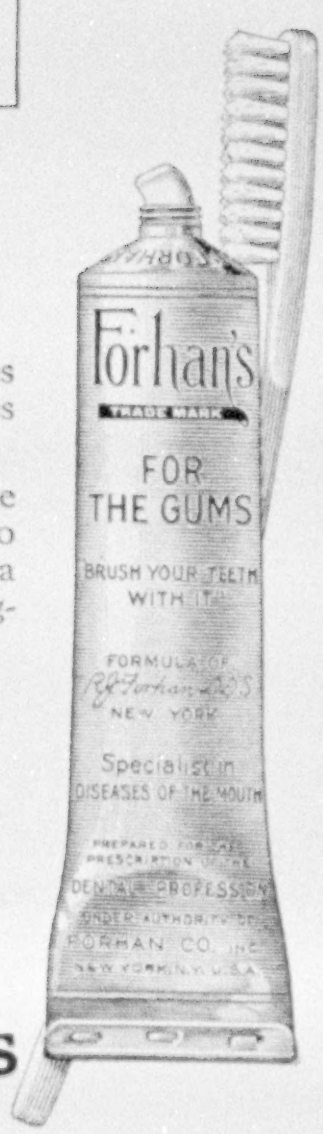
If used regularly, Forhan's helps to prevent or check pyorrhea. It contains Forhan's Pyorrhea Liquid which dentists use in combating pyorrhea's ravages. It firms the gums and keeps them pink and healthy.

The entire family should begin to use Forhan's today. Besides safeguarding the health it cleanses the teeth perfectly.

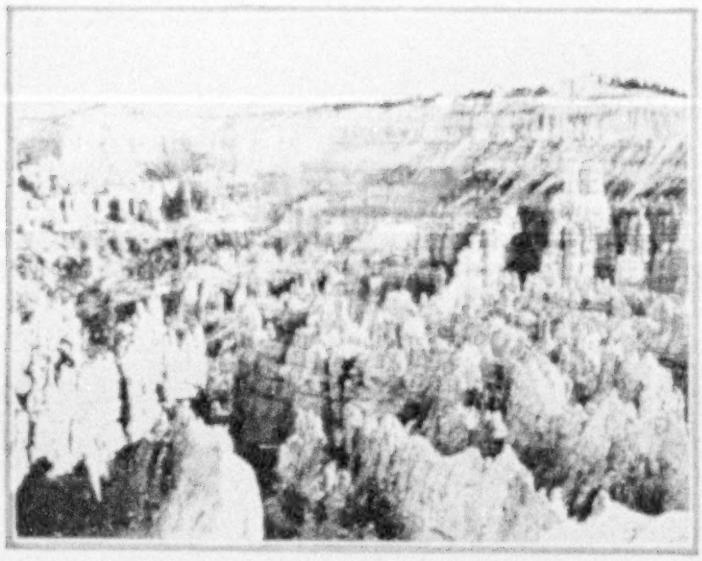
No matter what tooth paste you now prefer, you owe it to your health to make Forhan's a regular daily habit. At all druggists 35c and 60c in tubes.

Formula of R. J. Forhan, D. D. S.
Forhan Company, New York

Forhan's
FOR THE GUMS



MORE THAN A TOOTH PASTE . . . IT HELPS TO CHECK PYORRHEA



BRYCE CANYON

One of many scenic amazements near

Salt Lake City

"Center of Scenic America"

YOU will have a vacation of new pleasures visiting the tremendous wonderlands of southern Utah, a short distance from Salt Lake City.

The magnificence, the weirdness, the sublime immensity of Zion National Park, Bryce Canyon, Cedar Breaks, and the Grand Canyon, viewed from the north rim—can never be fully portrayed in words or in picture. You must **see** these places for yourself.

Salt Lake City is headquarters for scenic America, the center of 62 national parks and monuments. It is a city beautiful and interesting.

Free 10-day Stop-over allowed by all Railroads

Take a dip in Great Salt Lake, where you **can't sink!** See the "Mormon" Temple and Tabernacle, and other historic landmarks.

Mail the coupon for full information

Chamber of Commerce, Salt Lake City, Utah, Dept. G-2

I intend to visit Salt Lake City and am interested in a stop-over. Please send me a scenic pictorial booklet.

Name.....

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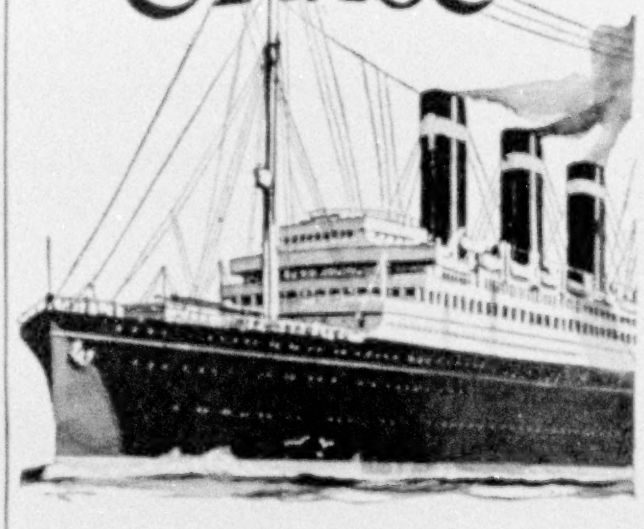
BELGENLAND WORLD CRUISE

Consider the ship as well as the Cruise



WHEN you plan a trip around the world consider the ship as carefully as you consider the cruise.

The *Belgenland* is the largest liner that ever circled the globe—and the finest.

Interesting lectures, plays, music. Trapshooting, deck golf, deck tennis, outdoor swimming, shuffleboard, quoits; and the supreme relaxation that only the sea can give.

The **Belgenland** *sails westward from* New York, December 14; Los Angeles, December 30; San Francisco, January 2. Returns to New York April 24.

Sixty cities, in fourteen lands—each at its brightest, loveliest season.

Red Star Line, No. 1 Broadway, New York; American Express Company, 65 Broadway, New York, or other offices or agencies of either company.

RED STAR LINE

INTERNATIONAL MERCANTILE MARINE COMPANY

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AMERICAN EXPRESS CO

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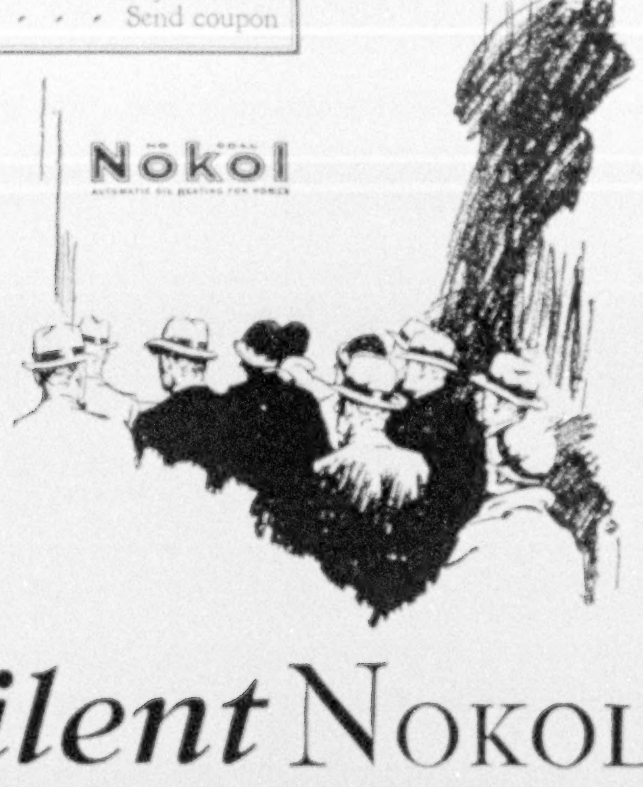
FREE: *New Guide to Oil Heat for Homes* . . . . . Send coupon



NOW:

the new ***Silent*** NOKOL

automatic OIL HEAT

Surpasses all past records of home-heating comfort. Noise cut to vanishing point. High efficiency increased. Send coupon.

THE entire oil heat situation has changed over night. A sensational comfort-development is now announced by the engineers who first made automatic oil heat practical for *homes*.

* * * * * * * *

Has the "noise bogey" made you hesitate to consider this modern comfort? *The new* Silent NOKOL *now cuts noise to the vanishing point!*

Have you thought automatic oil heat a high-cost luxury? For nine years NOKOL has proved the opposite—in thousands and thousands of homes. (Last winter in more than 29,000!)

Today even this record is surpassed. Past high-efficiency increased; even *greater* comfort provided.

* * * * * * * *

Have you thought—or heard—that there is an unpleasant odor with automatic oil heat?

There is not, never was, never will be such odor—either inside or outside any NOKOL-*heated home.* Because NOKOL can and does give low-cost heat without having to burn cheap, foul-smelling oil—of which bad odor is but one disadvantage.

Where to see it—
(clip coupon)

Clip and mail the coupon below—to learn where, in your locality, the new Silent NOKOL may be seen in operation.

You will also receive, free, the most intelligent book so far written on OIL HEAT.

THE NEW ***Silent***

NO COAL
NOKOL
AUTOMATIC OIL HEATING FOR HOMES
Reg. U. S. Pat. Off.

First domestic oil burner listed by Underwriters' Laboratories, approved by all leading safety boards. Manufactured and guaranteed by AMERICAN NOKOL COMPANY, Chicago

FREE: New Book

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Please send your "New Guide to Oil Heat for Homes"—and tell me where to see the new *Silent* NOKOL.

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Address .....

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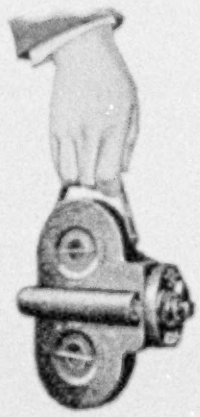
The World's Highest Quality Personal

Motion Picture Camera

Filmo

The Camera with the Spy-glass Viewfinder



THOUSANDS this year will abandon snap-shots for the newer, up-to-date sport of taking *personal motion pictures.* And the *Filmo* Automatic Camera, shown here, will be the natural choice of those habitually influenced by superior Quality rather than price. *Filmo*, the *personal* camera possesses many evident points of superiority.

Filmo Exclusive Features

(1) The spy-glass viewfinder, developed and used by Bell & Howell exclusively, allows the only method of viewfinding by which a moving object can be *quickly* and *accurately* followed and filmed. Try it and see. (2) *Filmo* allows of your using *eleven different photographic lenses*, each for a special purpose which you can easily learn. These special lenses are quickly interchangeable with the high quality imported F 3.5 Taylor-Hobson Cooke lens which is regularly furnished. (3) *Filmo* is the only personal motion picture camera which allows of change from normal speed (16 exposures per second) to *one-half normal* (8 exposures per second) for getting good results in poor light. (4) *Filmo* is entirely automatic. Requires no cranking, no tripod, no focusing for distance. Simply see your picture in the spy-glass viewfinder just as you want to take it, press a button and motion pictures are taken automatically. Your films are developed without charge ready to run. *Filmo* is designed as beautifully and precisely as a fine watch. It is truly the world's highest quality personal motion picture camera.

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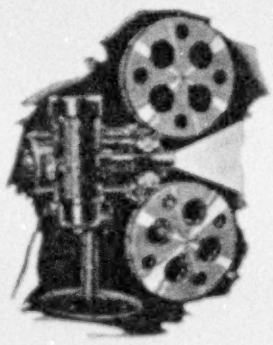

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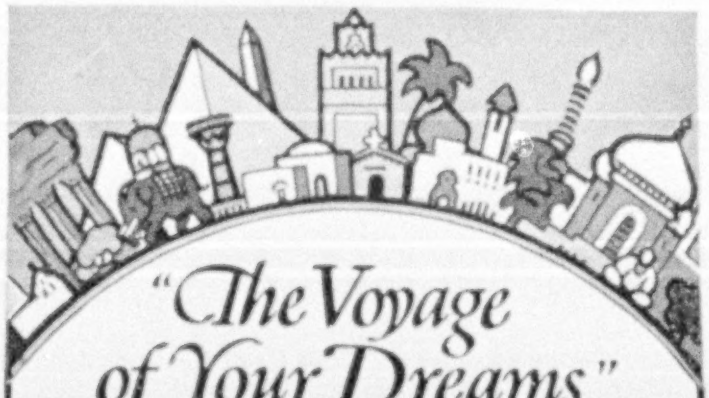

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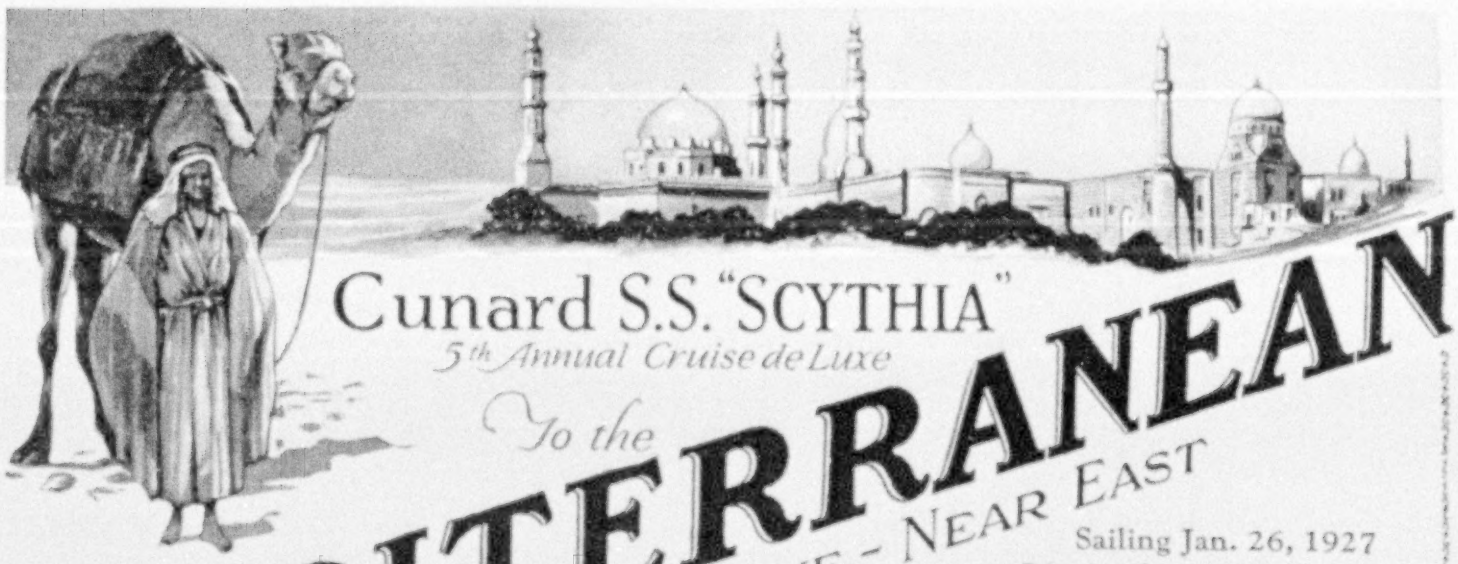

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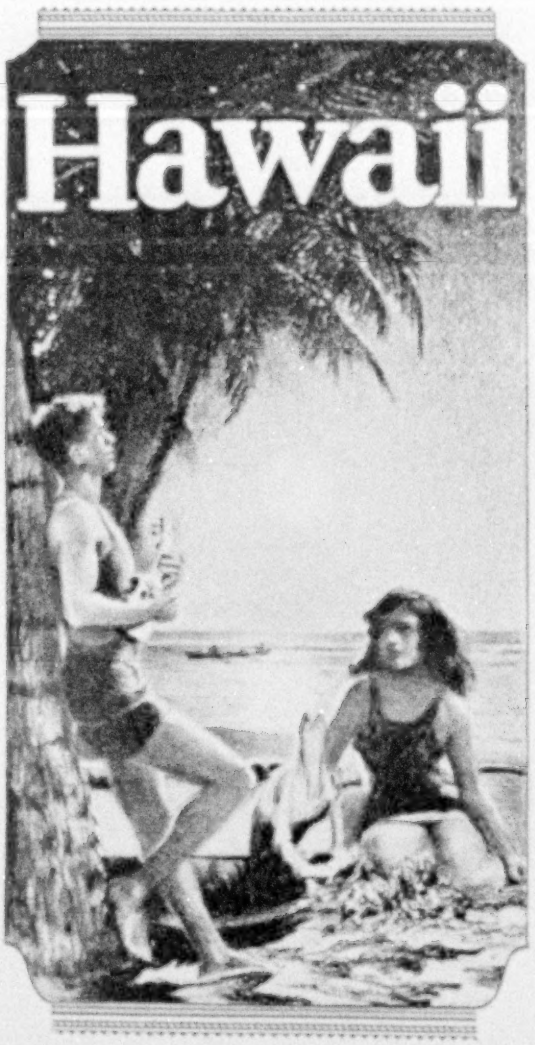

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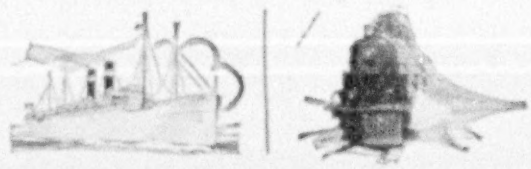

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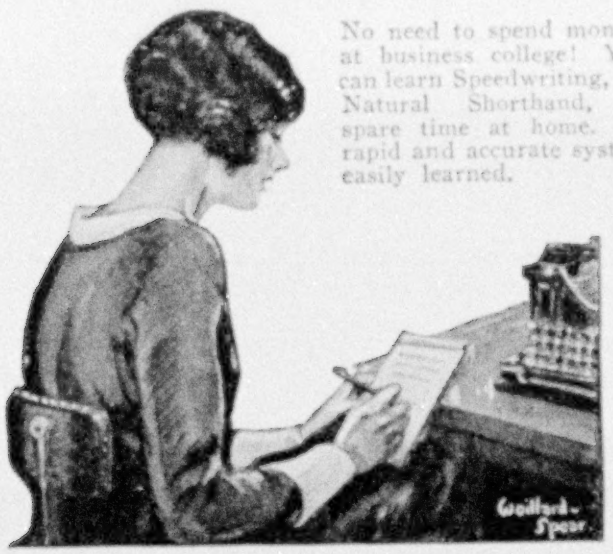

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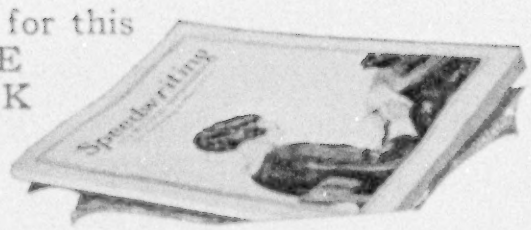

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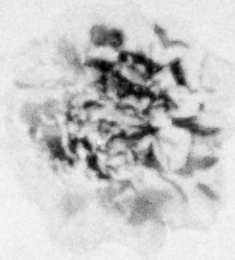

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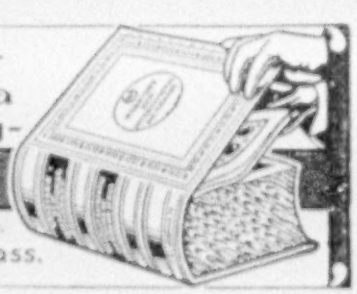

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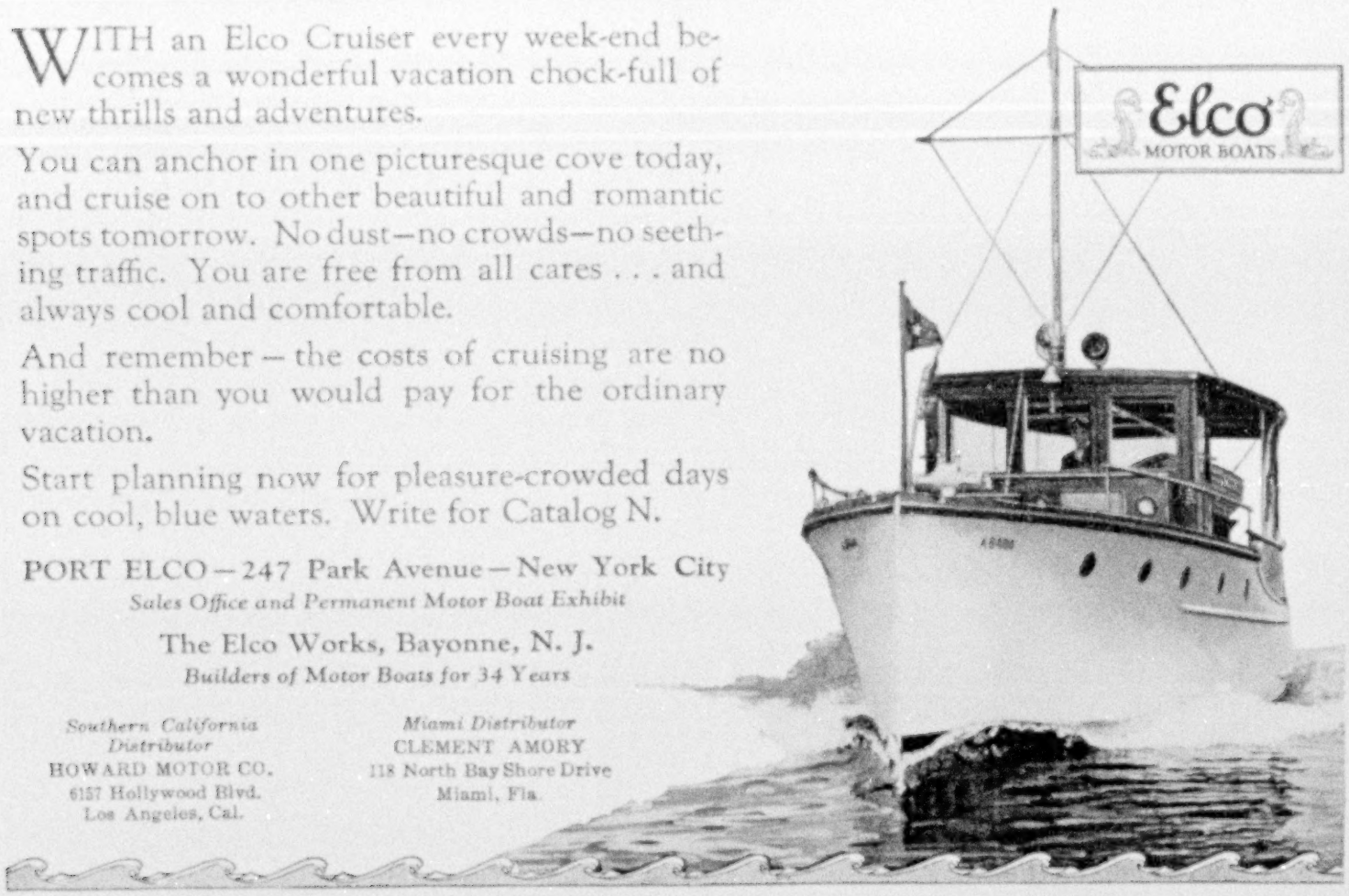

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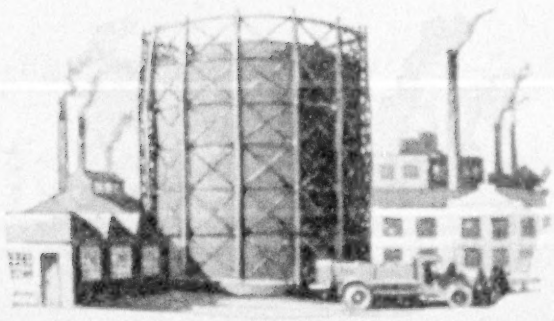

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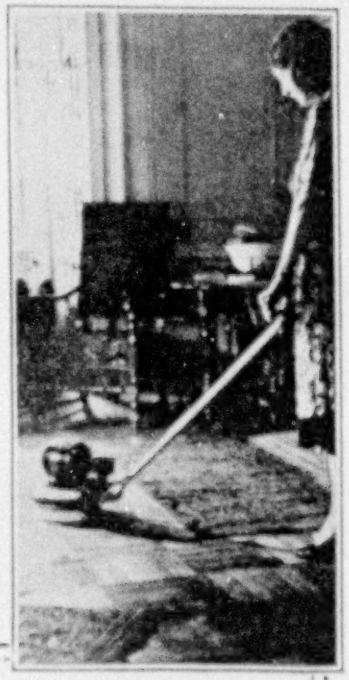
The most neglected floors have possibilities, once the ground-in dirt, and unsightly varnish are removed. Now they can easily be removed and without spending the hundreds of dollars that refinishing usually costs. A new electric machine enables you to do this work *yourself*—a machine that refinishes floors, scrubs floors, polishes floors—a machine that costs but a fraction of *one* refinishing job.

Refinishing only needs to be done *once!* The floor never has to be refinished again! Afterward a little waxing and polishing with the machine once in a while—an operation so simple that a child can master it—keeps your floors looking always as though they had been refinished the day before.

In 24 branch offices we have men ready and anxious to show you in your own home what the Ponsell Floor Machine can do. In thousands of homes it has already won the unqualified praise of users. It not only refinishes and polishes wood floors, but scrubs linoleum floors spotlessly clean without the least splashing.

It does away with all the drudgery. Gone is the stooping and kneeling, the wear and tear on your hands of water, soap, cleaning fluids, scrubbing brushes and wet rags. Then the machine polishes the linoleum with a result far surpassing anything you have ever known; a shiny, immaculate surface that dust and dirt have a hard time sticking to.



Take the first step toward more beautiful rooms, toward floors you are *proud* of. Mail the coupon for further information on how to refinish your floors yourself. Ask us for a FREE demonstration in your own home or a ten day FREE trial.

Ponsell Floor Machine Co.
Dept. 128
220-230 West 19th St., New York City

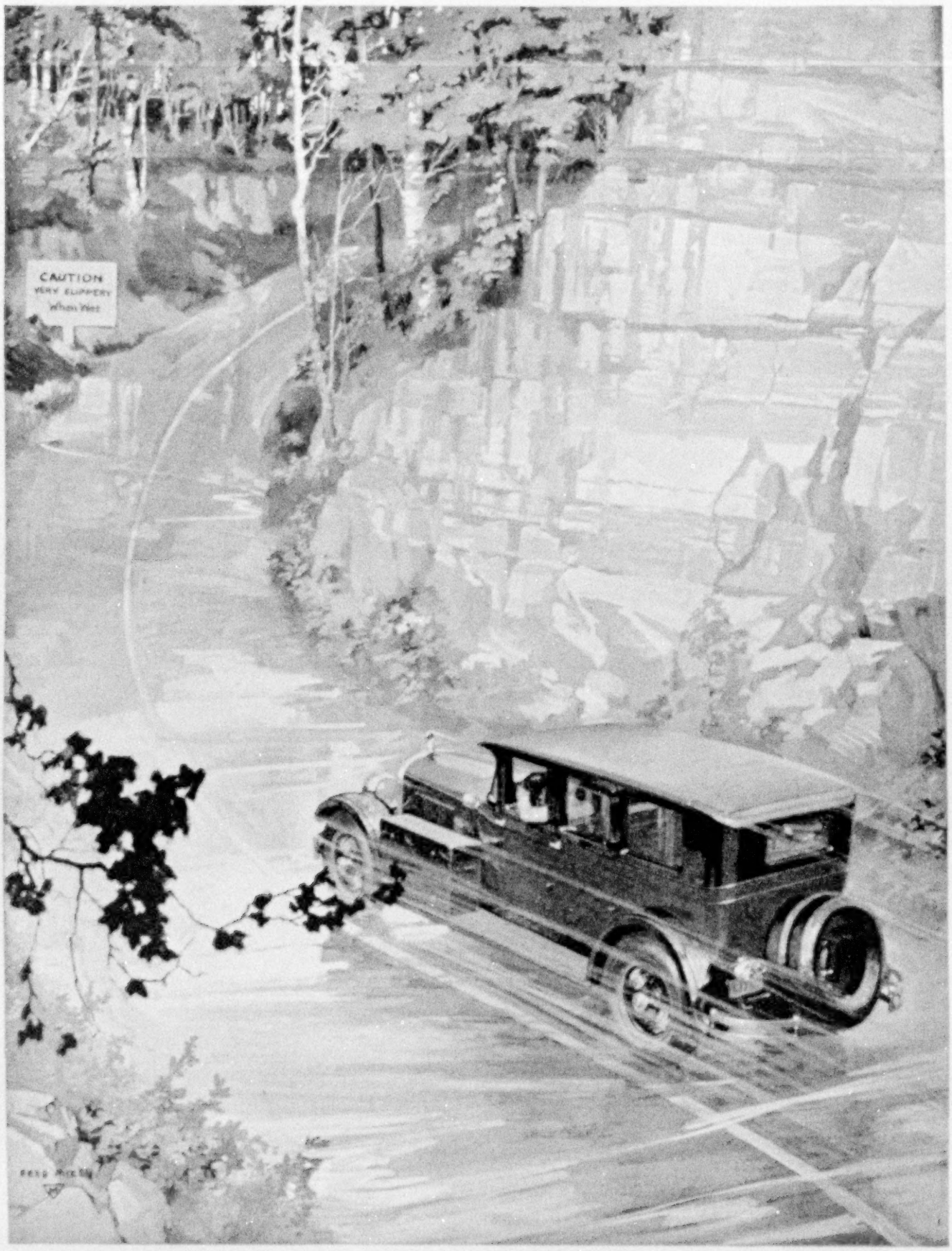
Please mail me complete information and prices regarding your Electric Floor Machine. This does not obligate me in any way whatever.

Name.....

Address.....

City..... State.....

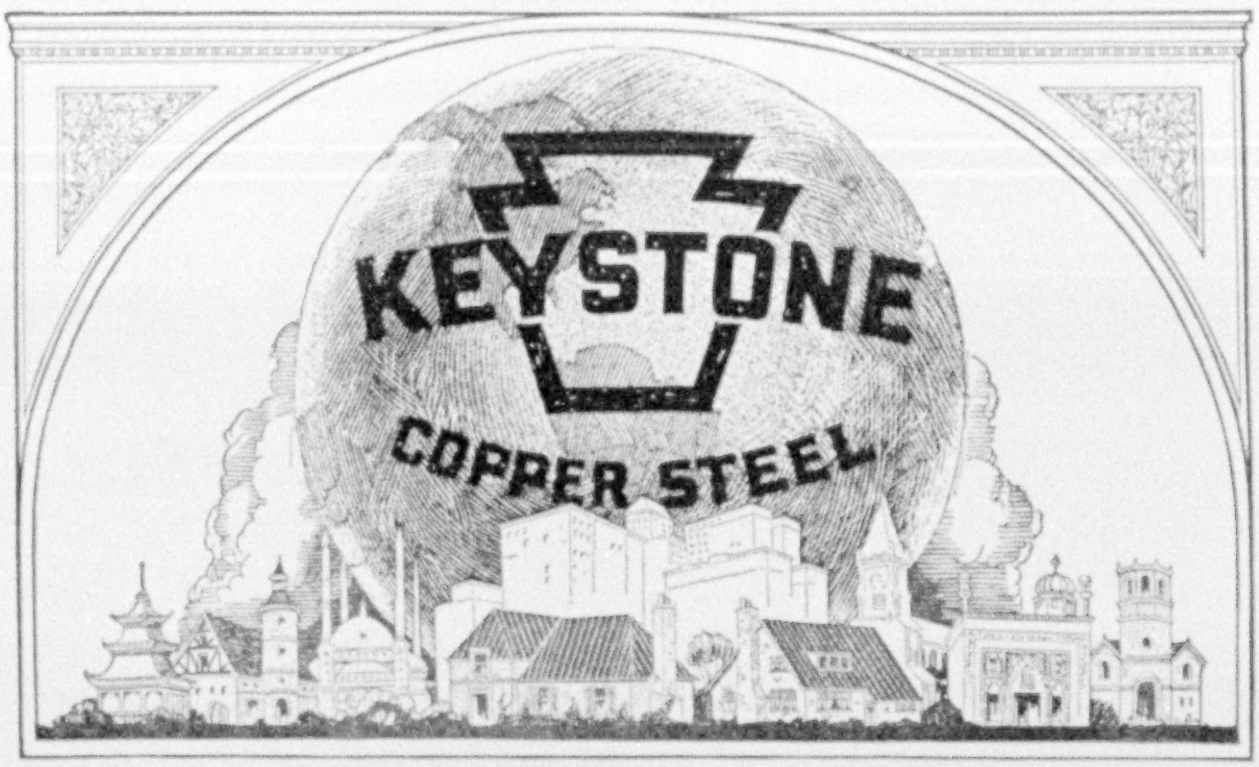
N. G. 8



THERE ARE TIMES WHEN ONLY A MARMON WILL DO

A WET, slippery uphill curve in an unknown land . . . . an impulse to hurry but caution warning you to ease up on the foot throttle and feel your way. Under these circumstances the owner of a Marmon makes his own ground rules . . . . He knows he can trust to the balance of his car and maintain the same cheerful clip . . . . inimitable spring construction . . . poise as fine as the most evenly keeled yacht . . . . a smoothly-fed torrent of never-failing power . . . these are things that have earned for Marmon the reputation of being the sweetest road car on earth and given every Marmon owner his priceless road confidence . . . . Truly, there are times when only a Marmon will do!

Cars sold, if desired, on convenient credit plan · Twelve distinct models to choose from



In every clime, the world around—for lasting sheet metal work use

KEYSTONE

Rust-resisting Copper Steel

Sheets

AND ROOFING TIN PLATES

This material gives maximum *durability and satisfaction* from roofs and all exposed sheet metal work. Protect your property from fire and weather—and add safety to service by using Keystone quality Sheets and Tin Plates.

Apollo-Keystone Galvanized Sheets are the highest grade rust-resisting Galvanized Sheets obtainable for roofing, gutters, spouting, tanks, and all similar uses. Keystone Copper Steel Roofing Tin Plates are unexcelled for residences and public buildings. Architects, builders, and home-owners should insist upon Keystone quality products for service and economy. Sold by leading metal merchants. Send for *Facts* booklet.

Sheet Mill Products

Black Sheets for all purposes, Apollo and Apollo-Keystone Copper Steel Galvanized Sheets, Culvert and Tank Stock, Formed Roofing and Siding Products, Special Sheets for Stamping, Automobile Sheets, Electrical Sheets, Stove and Range Sheets, Barrel and Keg Stock, Metal Furniture Stock, etc.

Tin Mill Products

American Coke and American Charcoal Bright Tin Plates, Taggers Tin, American Old Style and American Numethodd Roofing Terne Plates, MF Roofing Tin Plates, Black Plate for all purposes: Enameling Stock, Stove-pipe and Elbow Stock, Special Stamping Stock, Sign and Show Card Stock, etc.

Manufactured by AMERICAN SHEET AND TIN PLATE COMPANY, *Pittsburgh, Pa.*

DISTRICT SALES OFFICES

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PRESS OF JUDD & DETWEILER, INC.
WASHINGTON, D. C.

This might have been prevented

Bad Teeth May Shatter Health and Happiness

Authorities Declare That Tooth Neglect Can Cripple Its Victims for Life

Few persons realize, except in a general way, that the whole structure of good health may break down when teeth decay.

Just ask your dentist or physician. Either one will point out the tragic consequences of neglecting your teeth. You will learn that rheumatism, heart disease, kidney trouble—even awful cancer of the mouth—can be traced to the germs and poisons of tooth decay.

Speaking of tooth decay, the American Society for the Control of Cancer (Bulletin VI, No. 12) says most emphatically:

> "Consult your dentist . . . it seems desirable to point out that chemical disinfection of the teeth is an impossibility, and that harm may result from the constant use of irritating, chemical tooth pastes."
> (*Colgate's is non-irritating. It contains no harsh chemicals.*)

This society has made careful study of the relationship of teeth and health. Such advice as that just quoted should be followed by every reader of this publication.

Today it is recognized that tooth decay is a menace to the nation's health. That is why the science of preventive dentistry—the science of keeping teeth healthy by preventing tooth decay—has made such notable forward strides.

Much is being done to improve conditions. Colgate's Ribbon Dental Cream has always been in the forefront of this move for better teeth and better health. It is the preventive tooth paste. Use Colgate's to fight tooth decay before it starts. . . .

Give yourself a chance.

"He Said My Teeth Were Diamonds in the Moonlight"

WE HAD just danced together for the last time. Dick's vacation ended the next day, so we went to the beach to talk a little . . . and to say goodbye.

"Helen," he said, after we'd found a seat on a fisherman's up-turned boat, "your smile is the most joyful thing there is . . . your teeth are diamonds in the moonlight. . . ."

I could have added "Thanks to Colgate's," but why give away one's beauty secret?

* * *

Do you possess the charm of beautiful teeth? Do yours flash white and lovely when you talk and smile?

Colgate's Ribbon Dental Cream will make your teeth glisten gloriously. It will whiten them and bring out all their natural beauty. But more important . . . it will help to keep your teeth and gums healthy, for Colgate's foams into every hard-to-get-at place between the teeth and under the edges of the gums.

Here are students of a Citizens' Military Training Camp being examined for dental defects. Colgate's coöperates with thousands of dental authorities, school officials, and the like, in teaching dental hygiene.

Priced right, too! Large tube . . 25c.

Remove Those Causes of Decay

Colgate's penetrates every place where it is possible for germs and food particles to collect. Then it washes these impurities away, leaving your teeth and gums absolutely clean. The warm, dark interior of your mouth is an ideal breeding place for germs. But they can't lurk there and multiply when you use Colgate's regularly. Colgate's literally goes right into their hiding places and *removes those causes of tooth decay.*

Your mouth feels clean after using Colgate's . . . and it is clean. You'll like the taste of Colgate's . . . even children love to use it regularly.